

GREAT LAKES TECHNOCRAT

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Illustrating the Futility of Price System Methods of Operation; Interpreting the Trend of Events from the Social Aspects of Science; and Presenting the Specifications for Total Mobilization for Peace!

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TECHNOCRACY DIGEST

625 W. Pender Street

Vancouver, B. C., Canada

Social Implications of the Kilowatt Hour

Arithmetical to Geometrical

By Ralph W. Herring

The current flowing in any circuit is directly proportional to the electromotive force and inversely proportional to the total resistance of the circuit. (Ohm's Law)

Therefore, current (amperes) = $\frac{\text{electromotive force (voltage)}}{\text{circuit resistance (Ohmage)}}$ Algebraically, this is stated as $I = \frac{E}{R}$. The current is equal to the pressure, divided by the resistance.

Translating this into social terms, Ohm's Law can be stated thus: $I = \frac{E}{R}$ where I is the current of social change, E is the impact of technology and R is human inertia.

Therefore, social change = $\frac{\text{pressure of technology}}{\text{resistance of human interia}}$ Social change

proceeds at a rate proportional to the pressure of technology divided by the resistance of human inertia.

The impact of technology is increasing; the resistance of human inertia is decreasing. Ergo, the amperage of social change mounts ever higher. It won't be long now!

The First Step Is Observation

FOR all but 169 years of the 7,000 years of recorded history and for countless centuries prior to that, man struggled with his environment, eking out an existence that was little, if any, above that of the wild animals who were at once his food, his competitors for food and his deadly enemies. He fought this environment with the strength of his own muscles save for a few centuries just past during which he domesticated animals, contrived sails and a few crude water wheels and windmills.

Save for these few centuries if he succeeded in sustaining life, he did so by sheer force of his own muscle power, plus whatever cunning he could contrive. The club, the thrown stone, the spear, the bow and arrow, the battering ram, and the catapult came laboriously and slowly, impress-

ing him forcefully with the fundamental principle of them all, namely, that he with his own muscle power must supply them all with the energy they required to make them effective.

In this respect he differed from the other animals only in the greater range of effectiveness he was able to impart to his muscle power by means of his crude contrivances. It is true that this enabled him to sustain life more effectively. It enabled him frequently to render some attacking wild beast hors-de-combat before the beast was in a position to effectively bring into play its superior muscle power; or to strike down some prospective prey beyond the actual reach of his arms, but his status never permitted him to forget for a moment that his life depended solely and absolutely upon his own exertions.

The net result of his growing mental superiority over the other animals,

as evidenced by his contrivances to make his own energy more effective, was a longer life expectancy and an increased population, indoctrinated with the concept of the importance of human labor in the process of obtaining the means of sustaining life. It was along about this time that man got his first lesson in cooperative effort. It may have been the discovery that two human beings could more effectively fight off an attacking wild beast or that two could drag to the cave a carcass too large for one individual to manage alone, but he was still impressed with the importance of his own energy.

Nevertheless, cooperation was a great advantage and led to the development of the family group around the cave, the tribe, and with the increasing scarcity of food supply resulting from his more effective methods of procuring food, to the nomadic tribes and migrant hordes. Finally, as the hunting became progressively less adequate, he finally settled down to a more or less stabilized society, based on agriculture.

Throughout all this slow and painful upward trek of the human race, the most impressive thing was the necessity for human toil. Examination of the record of human progress which we have thus briefly outlined here leads to the following observations:

1. That energy was the dominant factor in human progress in the period outlined.
2. That this dominance was fundamental and absolute. (No energy, no food; no defense—death)
3. That the progress made was either the result of
 - (a) An increasing rate of energy expenditure, or
 - (b) an increase in the effectiveness of the application of the available energy to

the desired ends, or
(c) a combination of the two.

At this point, the engineer would want to begin taking measurements. He would want to know something of these rates of energy conversion in terms of scalar quantities. Being neither philosopher, politician, nor business man, the engineer would adopt the scientific method.

The Second Step Is Research

And so, like C. M. Ripley of the General Electric Company, the engineer proceeded to find out about the capacity of man to convert energy into work. Ripley started out, as all competent engineers do, by engaging in research to find out what was already known.

He found that engineers throughout the centuries and in many lands, have measured, in foot-pounds or other units, the work that all kinds of laborers can do in one day. He found that they have done it in England, Scotland, France, Egypt, and China. They have done it in Germany Russia, Italy, Greece, Sweden and Norway, and they have done it in the United States and Canada. Wherever engineers have carried out their projects, they have made these measurements. These measurements include lifting weights by hand, by hod, by wheelbarrow, by rope and by pulley; also turning cranks, shoveling, towing canal boats, hammering, sawing and pushing on a capstan.

Of all the engineering reports examined, they were all unanimous in one respect, namely, that, regardless of race and climate, in Orient or Occident, in this century or the last, not one engineer ever found any man, either laborer or athlete, that did the equal of 1 kilowatt-hour or 2,655,-200 foot pounds of work in a day,

and some men worked as much as ten and even twelve hours per day, as in China and Egypt. In fact, the day's work averaged only 28 percent of one kilowatt-hour, or only 280 watthours. Far less than the 746 watthours in a horsepower hour.

The Third Step Is Experiment

The engineer was not satisfied with this. He checked the reports by another scientific method. He experimented. He made measurements of his own. He built a stationary bicycle that drove an electric generator. He pedalled it hard for one minute and was breathless, and found that the electric energy he had generated was worth $1/40$ of a cent, or the price of one safety match. As a converter of energy, he wasn't so hot; but what about a stronger man?

He took it to Madison Square Garden and had a champion six-day bicycle racer pedal it for one minute in a desperate sprint. The meter showed .0018 kw. hr. If he and his teammate could have kept up this desperate sprint for six days and nights, they would together have generated 15.552 kw. hr. of electricity, worth about 78 cents, a very poor showing for a week's work for two famous athletes.

At the Better Homes' Show in Billings, Montana, 213 people rode this machine until they were tired and their combined work was $2\frac{1}{2}$ kw. hrs., worth 10 cents.

Finally, the engineer set up a hand-driven generator operated by a crank. It was specially built to get the highest possible efficiency. The capacity was 60 watts. Few men turned it more than a minute. The strongest man that could be located in Schenectady, a former pugilist, was offered \$12 an hour for as long as he could keep the 60 watts of lamps burning by turning the crank. He quit, exhausted in

just 13 minutes, and when reminded that he was making \$96 a day and asked why he quit, he gasped, 'The money wasn't worth the work.' He had exhausted himself in converting the energy equivalent of 1.3 percent of one kilowatt-hour.

Research and experiment had shown that what workmen could do varied from 9 watts in one of the hod-carrying jobs, up to 72 watts rowing and pushing on a capstan. The average power which a man can exert all day is 35 watts.

Thus we find that throughout all these countless centuries the energy available for the procurement of the necessities of life was of the order of $1/20$ horsepower per capita, and the emphasis on human energy was unbroken, save for a single event, the discovery of fire.

Social Change Began With Fire

Here, man had for the first time a means of converting energy for his own use without first eating food, converting it into chemical energy and then converting the chemical energy into work through the agency of his muscles. Today, it is this ability to convert extraneous energy (energy from coal, oil, gas, wind, and falling water) to his own uses that distinguishes man, more than any other thing, from the other animals.

The discovery of fire gave man not only heat, it also gave him a measure of additional protection from wild beasts. It enabled him to live in more rigorous climates, thus spreading his tribe over a larger geographical area. It cooked his food and gave him added comfort which resulted in an increased population, but it did not relieve him from toil.

During all these thousands of years, the energy input into human society was limited to the low order of magni-

tude of man-power. Any increase in energy input was predicated upon a corresponding increase in human employment. Man lived in an environment of scarcity. Surpluses were nonexistent. The social system was in a state of equilibrium. It was stable, and almost static.

A graph representing the physical state of the social mechanism throughout this period would be an almost perfectly smooth flat line, curving just perceptibly upward as man settled down into his agrarian society, broken only by the slight upward movement which resulted from the impact of increased energy conversion following the discovery of fire. (Ed. Note: See chart in middle of book)

This was the first indication that a change in the rate of converting energy might have an effect upon the stability of any given social mechanism. It still remained in dynamic equilibrium with its physical environment. There were none of those forewarners of trouble, so familiar to engineers, uncontrolled oscillations.

Enter The Price System

With the greater assurance of a food supply which came with the establishment of a society based on agriculture, man began to specialize in the techniques of producing a living. The introduction of the concept of exchange was a natural outcome of specialization of labor, a physical factor. Since virtually all production could be accounted for as the result of human toil, a system of commodity evaluation based on scarcity and man-hours of labor grew up.

During this state of society, any increase in production necessitated a corresponding increase in man-hours. As long as man-hours were the chief means of production, this concept was valid. Thus, it was possible to effect a system of exchange on the basis of

man-hours of labor for purchasing power, plus the factor of scarcity.

Concurrently with this, a folklore and religion developed based upon the apparent virtues of human toil. This concept has dogged the human race to this day, to political and economic crisis, to the very brink of disaster.

This system of effecting exchange on the basis of commodity evaluation did not at this time alter the relationship between man-hours per unit of production and total production. It brought no increase in the rate of energy conversion. The philosophy of 'Earn thy living by the sweat of thy brow' and 'Work hard and success will surely follow' grew up on the assumption that this was a permanent state. Alas, man's environment is dynamic. Change itself is the sole possessor of the characteristic of permanency.

We have made the mistake of assuming that it is a natural law that the creation of real wealth bears a fixed relation to human toil, whereas in reality, *physical wealth is created by the performance of work regardless of the source of the energy involved*.

The hour of destiny arrived in the year 1776. It was not July 4, 1776, but March 8. On that date, the firm of Boulton and Watt tested the first practical single-acting steam engine in pumping water out of a coal mine, and it worked.

For 7,000 years previous to that date the soldiers of Alaric and Attila, of Genghis Khan and Hannibal, of Alexander the Great and Charlemagne, and all the other great and near great, conquered and reconquered the known world and passed on to their reward, leaving both victor and vanquished as they had found them, with their measly 35 watt capacity. The tools of social change, despite the pomp and fanfare and the spilling of human blood, were not at hand.

On March 8, 1776, the firm of Boulton and Watt wrote the death sentence of the Price System in America. Technology, the tool of social change, was at hand. The means of converting energy from fossil fuels had been discovered.

Enter North America

Given an area large enough and homogeneous enough and with sufficient resources, the impact of increased energy conversion was destined to set up oscillations that would wreck any system of social control based upon human toil, scarcity and the exchange of goods and services at a price.

Such an area existed on the Continent of North America. By happenstance of nature, this continental area had been endowed with all the requirements for the development of a high energy, technological civilization which could produce an abundance.

No longer was the destiny of the people of North America linked to a 35 watt capacity. From that time on, things happened fast and furiously.

On August 30, 1831, Michael Faraday discovered electromagnetism and in no more than ten full days of application this master of method and research had produced the world's first electric generator. On September 4, 1882, with the opening of Edison's Pearl Street Station in New York City, the march of kilowatt-hours was on its way.

By 1920, the annual electric energy produced in the U. S. had reached the sum of 43,334,282,000 kilowatt-hours. By 1940, it had advanced to 144,984,565,000 and the end was not in sight. The year 1943 saw 220,969,521,000 kw. hrs. produced. This was an energy conversion rate of 4.48 kilowatt-hours per capita per day, or an increase of 1,600 fold in

169 years from electric energy alone. Vast amounts of energy not converted to electric power were also produced, such as that from steam, oil, gas, etc.

Guy With The Missing Brain

Upon examination, we find ourselves engaged in the absurd attempt to make 280 watt-hours per capita (generating capacity of the human body in an 8 hour work-day) equal more than 4.48 kilowatt-hours per capita (actual amount used). Our Price System economists are still juggling the figures in a vain effort to make them come out even. Our concepts of toil, etc., do not jibe with the physical facts.

The old-rabbit-in-the-hat trick of government deficit spending has so far been the only way of balancing the equation. Economists borrowed it from the magician and it is phony. Besides, every time the economist pulls a rabbit out of the hat and puts it on the low side of the equation, the engineers build a new power house and put it on the other side.

Those at the controls of our social system have no more understanding of the physical phenomena involved than the saloon keeper who called the Electric Company to thaw out his frozen water pipe. The company sent the truck with the low voltage transformer used for this purpose. On arrival the men connected the transformer to the power supply and the water pipe, and in five minutes the water came gushing through, whereupon the man in charge asked the saloon keeper for \$10, the standard charge for this service. The saloon keeper protested that \$10 was too much for five minutes' work and refused to pay. The serviceman was resourceful. He stepped to the door and called out in a loud voice to his assistant, 'Reverse the connections, Bill, we will have to freeze him up again,

he won't pay!' At that, the saloon keeper rushed over and paid the \$10.

There Is No Balm In Gilead

As we look back from our vantage point of 1945, we find that our social mechanism has been developing the dread phenomena of oscillations, which increase in both frequency and amplitude with time. We do not see the rhythmic rise and fall of good times and bad, which economists claim to see. We see a condition similar to an ever-accelerating flywheel, with a weight of 35 watts on one side and 4.48 kw. on the other, while some one stands by and continually adds weight to the heavy side.

Every engineer will recognize the oscillations set up as the type which become progressively more violent, until certain physical limits are reached, at which point sudden disintegration of the system takes place. (Ed. Note: See Chart in middle of book.)

There is no such thing as reaching a maximum and leveling off or a gradual diminishing of these oscillations, without altering the physical factors.

We have tried to give you a picture of the revolutionary change which has resulted from the displacement of man-hours of labor by kilowatt-hours. These changes have produced three well-defined, long term trends:

1. Increasing production of goods and services.
2. Decline of man-hours per unit of production.
3. Decline of total man-hours.

The social implications of these trends are:

- a. Actual production of abundance of farm products and the materials for war.
- b. An enormous potential abundance of consumers' goods

and services, if and when war-born technology is converted to peace-time consumers' goods production.

- c. Diminishing total of man-hours of labor to be exchanged for goods and services. Less purchasing power. Less consuming privileges for a greater number of American people.
- d. Abundance destroys value; therefore, abundance cannot be exchanged for a price.
- e. There is a conflict between the physical realities of modern power-driven technology and the antiquated social-controls of Business and Politics. The casualties of this conflict result from malnutrition, slum housing, inferior clothing and other products, low standards of health, etc. It all sums up to insecurity and scarcity in the midst of potential security and abundance.
- f. This conflict is fast approaching a crisis. If not resolved, the inevitable result will be chaos.

The Evidence Speaks To All

The march of kilowatt-hours is threatening the existence of antiquated laws, customs, habits, values, political and economic concepts born of hand-tool, human toil conditions existing in the dead past.

Social change is imminent. The question is, will social change take place in a smooth, orderly manner, under scientific direction, or will we enter a chaotic period in which all that we consider useful in modern American civilization will be destroyed, along with a large fraction of our population?

This picture of changing states of energy-conversion and its social implications is indeed frightening. We didn't paint it. Facts painted it. Technical men engaged in the design, installation, maintenance and operation of electrical equipment will understand this picture, and they will realize the futility of expecting the gentlemen of politics and business to understand much, if any, of these phenomena and social consequences of power production. Not understanding these problems, it is futile for them to attempt a solution.

The responsibility of solution rests with the technically trained men. They alone are equipped to read the warning signals and facilitate social change.

We urge you to get acquainted with your Technocrat friends, study their data and blueprints, and act before it is too late.

Author's Note

In preparing this material for publication, it was decided to include two charts which are important. One is a graph of the pig iron production in the U. S. (Ed. Note: See graph on

page 20), and the other shows the growth curve of electric power production in the U.S. from its beginning through 1944. (Ed. Note: See curve on page 20)

Pig iron was chosen because of its basic nature in the technological civilization of America. It is probably one of the best, if not the best, indicators of physical production of any single commodity on the North American Continent, and displays the characteristic increase in both amplitude and frequency in its oscillations as shown in the theoretical curve chart of Fig. 1. (Ed. Note: See chart in middle of book). Thus, we have an actual concrete example of the phenomenon under consideration. The electric power production growth curve was included to show the nature of the increase in energy conversion on the North American Continent.

For a combined curve of a large number of commodities and services which gives a highly accurate picture of overall physical production on the North American Continent, see Technocracy's Basic chart, *Physical Trends Shape Americas Destiny* (Ed. Note See Technocracy's Basic chart on page 19).

Now I'll Tell One

'I believe automobile manufacture will start right where it left off for war work four years ago. Then the changes, if any, will be dictated by the public—whether it be faster cars, lighter cars or cars with larger luggage compartments. We'll try to give the public what it wants.'—Charles F. Kettering, vice-president of General Motors, in an address before the American Automobile Association in Chicago, Nov. 11, 1944 (As reported in the *Chicago Daily News* of the same date).

'Doubtless the results of these public opinion samplings will be digested with

interest by those responsible for the design of motor car bodies, but it is not likely they will be taken too seriously for the industry is well aware that cars are designed primarily to sell, and thus the appearance of the product on the sales floor may be of more importance than the minor annoyance of some owner over the shape of a window lift handle. There is a certain amount of aloofness between designers and the public, the former often feeling that buyers will take whatever they, the creators, decide is good for them.'—A. H. Allen, Detroit Editor of *Steel* in the Jan. 15, 1945, issue.

The Engineer's Worth to Society

By Albert G. Conrad, Chairman, Department of Electrical Engineering, Yale University

Reprinted by Permission of *The Yale Scientific Magazine*
Winter 1942

AT no time in the history of our country has our social order been so totally dependent upon science and engineering for its own preservation than in the present crisis.

It is not my intention to emphasize the importance of electrical engineering in this presentation. The aims of all branches of engineering education are the same. Any reference that I use in the electrical field is used only as an example. My interests are not limited to electrical engineering only. After teaching electricity for 15 years I have come to the conclusion that electricity as electricity is a most worthless form of energy. It is not found in nature in quantities that can be utilized industrially. The most powerful lightning strokes that split trees, shatter buildings and create terrific noises, if converted to electrical energy and sold at the rate that is charged by our local power company, would be worth approximately 40c per dozen. It is possible to obtain a small amount of electrical energy from the junction of two dissimilar metals at certain temperatures, but the amount obtainable is too small to consider such an arrangement a source of industrial power. Electricity is generated in the cells of living tissue. The presence of a cancer is apt to cause this voltage to be higher than the voltage of normal tissue. However, this higher voltage cannot be used as an indication of cancer. Poison ivy, mosquito bites, can produce similar changes. All of these voltages are small and usually amount to a few millionths of a volt.

Human Output

The mechanical output of a man is many times larger than his electrical output. A brawny athlete, when working at full capacity can do approximately the same amount of work in a day as 1/10 h.p. motor working during an equal interval. This energy evaluated on the basis of the energy rate of one of our local public utilities would be worth approximately 4c per day. Of course this is not all of the mechanical output of a human being. At rest the average person radiates heat at about the same rate as a 70 watt lamp. This radiated energy is worth about 7c per day. The total energy output of the average individual is therefore worth approximately 11c per day. The average person eats approximately \$1.00 worth of food per day. In return the best that can be expected is 11c worth of energy. The efficiency is nothing for the human race to brag about.

How then can a civilization exist when our consumption is so much greater than what we ourselves are able to produce? The answer is simple. We are a bunch of parasites. We are living on what we can get out of the storehouse of civilization and our most generous benefactor is mother nature. She has placed coal in our hills, oil in our sands, and water in our streams. These, our natural resources, are the things that permit us to enjoy a standard of living that our ancestors never dreamed of. The importance of these

Continued on page 12

Electricity Knows No Bounds

Reprinted by Permission from Power Plant Engineering,
January 1945 (Italics ours).

ELECTRICAL ENGINEERS have no misgivings about the future as far as their own work is concerned. They feel confident that the future is going to flow from the past without interruption and with increasing acceleration. *Electricity is the common denominator of everything in the Universe* and they know that they can make it do anything they want it to do.

Electrical engineers work through the natural laws which govern the workings of the Universe. While these laws are inviolable they are not necessarily limiting. Only man made laws are limiting. As aptly expressed by David Prince of the General Electric Co., nature's laws are partly for the purpose of directing us to the things we can do instead of limiting us to the things that we cannot do.

Some of the things with which electrical engineers and electrical scientists are working with are truly appalling in their ultimate effect on the human race. We know what such things as radar are capable of, we know something of what it means to be able to drop from two to four thousand tons of bombs on the enemy in a single day, and we also know the devastating effect of a pilotless robot plane carrying a ton of explosive when it hits a densely populated center. But we do not know exactly what it would mean if we should find out how to isolate, say 5 pounds of uranium 235. There have been vague reports that the Germans have been working on an atomic energy bomb. No doubt this is true but it does not mean that they have succeeded in producing such a bomb. We, also, have

been working on developments of this kind and while it is unlikely that such weapons can be perfected for use in this war, it is not for us to say that they will not be available for a third World War if we are foolish enough to let the politicians lead us into a third war. Such a development would all but finish us. A medium size atomic bomb would wipe out London or New York and in the language of Shakespeare, "leave not a wrack behind." Irving Langmuir, Nobel Prize winner in physics pointed out not very long ago that a quart of electrons separated from associated protons and neutrons would expand with an energy equal to the explosion of a cube of TNT 500 miles on a side, reaching from London to Berlin! National sovereignties become meaningless in the face of such prospects.

They are not pleasant prospects but they are unpleasant only because man can make them so. There is also a pleasant side. Many people throughout the world, now, are worrying about the eventual exhaustion of our oil resources, and this goes for coal also, although coal will last much longer than oil. But if we can learn how to separate electrons from protons there will be no reason for us to be concerned for then we will have a potential supply of energy where one pound of material will give us two billion times as much heat as there is in the best high octane gasoline.

A few years ago, there was considerable discussion in engineering circles about the possibility of direct-current transmission of power. At that time, the problem of overcoming instability on long a-c lines had not

been solved to the extent that it is today and direct current at high voltage offered definite advantages. This is still true today and today we are much further along toward the ultimate carrying out of the d-c transmission idea. *With our high power electron tubes of the present day it would be quite within the range of possibility to build a high voltage d-c transmission line if we wanted to do so.* It is not certain that we want to do so but it could be done. As a matter of fact a short high-voltage d-c transmission line has been in commercial service for a number of years with excellent results.

Today, however, a new possibility exists. We have learned how to transmit power at high frequencies for considerable distances without wires by the use of wave guides. Microwave "plumbing" it is called. So far, this method of transmission has been used only in the communication field but who is to say that the principles involved in this method of transmission will not, some day, be used for heavy power purposes? By this method it is possible to transmit electric power through a rubber hose.

Modern electron tubes have a much more immediate application in the power field than that involved in d-c transmission, i.e. in the conversion of a-c into d-c for control purposes. One of the things electrical engineers have been working on ever since a-c transmission came into general use was an a-c motor that had speed characteristics equivalent to those of the d-c motor. All sorts of ideas were tried, all sorts of makeshifts improvised but no a-c motor, however good, ever was quite as good as the d-c motor in respect to its speed characteristics. Today, however, we can take alternating current of any frequency, convert it to variable frequency for use in a synchronous motor or to direct current for use in an

ordinary d-c motor. In other words, today, because of the electron tube, we can operate d-c motors from the a-c lines. As yet, equipment for controlling motors in this fashion is available only in comparatively small sizes but there is nothing in the idea to prevent its use with the largest motors in use—all that is needed are larger tubes.

During the past year there was installed in one of the large steel mills an electron tube frequency changer with a capacity of 20,000 kw. As described in the December 1944 issue of *Power Plant Engineering*, this unit is designed to exchange power, reversibly, between 25-cycle, 44 kv and 60 cycle, 69 kv systems. Now, 20,000 kw is still comparatively small compared with the power of a 160,000 kw generating unit but it is anything but chicken feed. If we can make a 20,000 kw electron-tube converter, we can make a 100,000 kw unit—it is merely a question of whether we want to do so or not. The day of the rotary converter is about over and nobody will be sorry because they have been sources of plenty of trouble. This does not mean that no more rotary converters will be built; it does mean, however, that increasing attention will be given to electronic conversion.

As has been pointed out in these pages frequently in the past few years there is nothing particularly new about electronics except that, at long last, we are beginning to apply it. Take the case of high frequency heating; this was developed in the laboratory over 20 years ago. In the early twenties it was possible to surface harden small steel parts by means of high frequency currents generated by electron tube oscillators. Only during the last four or five years has this method come into active commercial use. With it, we can take the outside of a metal part, heat

it to red heat and chill it again in so short a time that only the surface is hardened. Or, if we want to heat the interior of a body we can do it easily and quickly by similar methods without disturbing the outside of the body. In all these things we have made only beginnings. They will be developed and extended in countless ways.

In the field of measurement and instrumentation, electricity can do anything we require. We can measure distances of a billionth of an inch or speeds within a fraction of a per cent of the speed of light. We can measure electric currents of six electrons per second. By means of the photoelectric recorder, we can record variation in currents measured in microamperes as easily as, a few years ago, we could record currents measured in amperes.

Electricity is also doing things which formerly were done largely by the human brain. In the oil refinery processes, for example, there are processes where hundreds of valves have to be opened and closed in proper sequence. The intervals involved are so short and the multiplicity of the operations so great that it is no longer possible to do them manually, so electric brains have been developed which do all these things in perfect sequence and with absolute accuracy.

In some fields, electricity has all but replaced our very thinking processes. Consider a machine developed jointly by Harvard University, the International Business Machine Co. and the Navy during the past few years and now in operation in the solution of complex mathematical problems. This 5-ton mathematical robot can solve any problem in applied mathematics put to it with results reading to 23 decimal places. It actually consults logarithmic and other functional tables. It is powered by a 2-hp motor, works 24 hr a day, 7 days a week and never asks for time-and-a-half. Addi-

tion and subtraction takes the machine 0.3 second; multiplication, 5.8 seconds; division, 14.7 seconds. In a period of 19 hr. it solved a problem which had required 3 weeks work by 4 experts using ordinary office calculating machines. In some ways, this algebraic superbrain is one of the most remarkable inventions to come out of the war. (Ed Note: See *Great Lakes Technocrat* May-June 1945 issue, page 34)

In some fields of electrical engineering it might seem that we have gone about as far as we can go. We have generators and transformers so high in efficiency that unless we do away with the law of conservation of energy we cannot expect to have much further development. Transformers have been built with efficiencies better than 99.5 per cent. What more can we ask for in this direction? Not much, true, but as David Prince has pointed out, we can still make transformers and generators smaller and we can develop new materials to make them better in other ways than merely increase their efficiencies. We are learning how to make them faster and cheaper and so, more available to mankind. For the first time in history we have 30,000 hp steam turbines in quantity production; at the same time we have reduced the number of man-hours to make one of these units to 71 percent of what it used to take before the machines were standardized.

As far as future progress is concerned, from a technical standpoint there is practically no limit to what we will be able to do if we want to do it. The war has brought this home to us as never before. Many technical developments are held back merely by the fact that a small group of people cannot make any money out of them. That happens to be the case with television. We could have excellent television today, indeed we have it, but its commercial development is held

back by a sort of vicious circle involving on the one hand, the buyer of television receivers and on the other hand, the buyer of television service. Unless there are enough television receivers installed in the homes throughout a certain area, the television broadcast stations cannot get sponsors to pay for television programs. Conversely, unless the public is assured of satisfactory television programs, people are

not inclined to purchase television receivers at a price of from \$200 upwards.

What is true of television in this respect is even more true in many other branches of the electrical art. So far we have barely scratched the surface in the use of electricity but we need something in peacetime, comparable to what we have in war to make us develop these uses.

ENGINEER'S WORTH TO SOCIETY

Continued from page 8
resources is not limited to their effects on our standards of living. National resources are a far greater factor in deciding the supremacy of nations than dynasties or conquests. It is the lack of these resources that has made some dictators aggressive for additional territories and at the same time in other parts of the world the scarcity of these resources has limited aggression more than peace treaties. The date at which these resources are being used is appalling. In some parts of the world they are practically exhausted. We in later life will probably regret having used them so lavishly at this time. And in spite of the fact we are doing nothing to conserve them. Thrift is inconvenient.

Potential Power in the U. S.

We, in the United States, are particularly fortunate in having $\frac{1}{2}$ of the world's coal supply, or approximately 3,830,000,000 tons. This is no small pile of coal. What is it worth to us? If this coal is converted to electrical energy and sold for 4c per kw. hr. it would bring a return of approximately \$300,000,000,000. This is about 30 times the gold supply of the entire world. The United States has 26,700,000 h.p. of water power avail-

able. This is $\frac{1}{6}$ of the world's supply. What is it worth to us? Converting it to electric energy and selling it at 4c per kw. hr. would bring an annual return of \$5,000,000,000.

The value of anything depends on the use to which it can be put in supplying man's needs. Our coal had little value 70 years ago. People did not realize its value as a fuel. But through science and engineering this worthless black deposit has been made to have a value of \$300,000,000,000. This represents the creation of wealth. This is engineering. The engineer creates wealth. The economist attempts to control its distribution. He does not create it. These natural resources have provided wealth. The standard of living in the United States today is directly dependent upon the intelligent and continued use of these resources. It has been said that electricity in modern life is second in importance only to food and shelter. If we were to open the switches in our power plants, our modern machines would be worthless. Our refrigerators and heating systems would cease to function and elevators would stop between floors in darkened shafts. Fire and police systems would be inoperative and crime would be rampant.

Continued on page 42

When the Lights Went Out

Truth Is Stranger Than Fiction

By J. Cozzy Graham

Within the very near future, North America will be faced with the most serious crisis in her entire history. Technocracy seeks to avert this crisis. For the last twelve years Technocracy has correctly analyzed America's problems and indicated that this condition would arise. This is not mentioned in the spirit of 'We Told You So,' for 'Technocrats are no smarter, neither are they any dumber, than other Americans. They differ mainly in that they approach America's major problem along a new pathway, the pathway of Science. Technocracy IS Science applied to the social mechanism. In that sense we are Pioneers. We have no antecedents to show us the way, nor any precedents to guide us. No one has ever been over this path before.

In The Beginning Was Energy

HERE are probably the only technical statements we'll make in this entire article:

Energy is the capacity to do work, whether in the food we eat or in the form of coal, oil, gas or waterpower converted through technological equipment.

It is by the continuous flow of energy that we live. Shut off that flow and we perish.

The greatest cause of confusion amongst the leaders of Party Politics, Corporate Enterprise and the population in general is their complete ignorance of the kind of a physical world in which we live today.

What does this imply? Let's see if we can illustrate with a few notes from the diary of an average man or woman:

Arose this morning, pressed switch button on wall; presto, there was light. Under the shower, manipulated a couple of faucets; presto, hot and cold running water. Flushed toilet; more water. Down to breakfast, hot coffee steaming on electric

percolator, toast browning in electric toaster, fresh cream from electric refrigerator. Turned radio on the newscast. Remembered to call office, dialed phone, instantly in communication with my party. Got into my car, put key in switch, gas tank full, stepped on starter, shifted lever, on my way.

Arrived at plant; brightly illuminated with fluorescent lights; assembly line in operation; conveyors moving overhead; motor carriers scurrying all around the place; bustle of activity.

Went into office; boss talking over intercommunication system, girls operating comptometers, teletypes and other devices.

But why go on; it's all in the day's work. Correct! And so easily taken for granted. Do we know what makes this type of civilization possible? It is the continuous flow of energy transformed through technological equipment. Nevertheless, we remain blissfully ignorant of the character of this complex mechanism.

We concern ourselves only with its control and operation as an academic

subject, or else as it concerns a monetary or political struggle for advantage. Who operates it, where and what is its motivating power, when is it oscillating? These things never concern us. Only when the lights go out are we momentarily aware of how utterly helpless we are without it.

Energy Is Still The Beginning

The people of Kansas City experienced a few hours of chaos on September 17, 1941, when their city was paralyzed by a power strike. The editorial writers could find nothing more significant to write about than the reprehensible behavior of the power plant operators. They missed the bus completely on the social meaning of the important of power.

On December 12, 1939, 12,000 families in Regina, Saskatchewan, found themselves seriously inconvenienced for several hours by a shutdown of their power plant. Darkness blanketed the interiors of buildings, water taps produced just a 'gurgle' as lack of power reduced pressure in water pipes. Hygienic facilities were seriously handicapped. With no other facilities available, toilet bowls filled. The only outdoor privies were well on the outskirts of the city beyond the water mains.

These two examples are picked from amongst many such incidents. To the uninformed these events are nothing more than conversation pieces. To the informed they are indicators of the radical change in the structure of our Social Mechanism. They are advance notices that a new type of control, conforming more nearly to these physical factors, is imperative if we are to survive a period of crisis.

How real the danger is can readily be understood by reconstructing the authoritative reports of the following incident.

Technology Is Tenuous

On January 15, 1936, the Consolidated Edison Company of New York City ran this advertisement in the *New York Herald Tribune*:

"NEW YORK CAN'T STOP"

Imagine what would happen if some disaster destroyed one of our generating plants and we had no other? Imagine being marooned on the 50th floor of one of New York's skyscrapers if there were no *reserve* electricity for emergency!

New York must always have ample reserves. That is why we have 7 great generating plants, strategically placed about the city and all interconnected so if any should fail, the others may be called upon. Thus, the essential character of utility service is preserved. . . . That is **DEPENDABILITY**.

The Edison Company meant well, but before that day was ended, New York was to experience an event which made a dramatic mockery of that ad.

The Hell Gate Power Plant, second largest in the world, supplies power for all of Manhattan north of 59th Street, the entire Bronx, and part of wealthy Westchester County. In this area are located approximately 500,000 offices, apartments and homes.

The Central Control Room of the station is at 40th Street and Ave. A. The walls of this room are covered with hundreds of dials and lights. Before them sit three shifts of engineers working night and day. This is the Control System which directs the distribution of power (energy). In accordance with the flutter of a dial gauge or the flash of a light, these engineers can tell where power is needed or where too much is being supplied.

By direct wire and phone connections with each generating station, they increase or decrease that plant's output as required. The heart of the Hell Gate plant is the Buss Bar, 400 feet of pure leaf copper, 6x8 inches thick. It is divided into six sections, each separated from the other by concrete walls and double steel doors. Forty feeder cables feed up to this Buss from the eight turbines in the basement. The power is then distributed to the City of New York from the Buss, like a great heart pumping out life blood through the arteries of a Giant.

At 4:00 p.m. of that day, everything in the plant was running beautifully. The giant turbines in the basement howled louder and louder, as each minute the control called for more and more power, and the power was being supplied. At 4:16 p.m., the fireworks literally started without warning. Sitting before the central control panel down at 40th Street, the engineers were startled by the flash of green light. Green meant open switches.

The Veneer Is Very Thin

The 6-6-3 signal, the worst signal in the code system, flashed on. This was the SOS. It meant that every switch in the giant plant had been blasted open. What had happened? It was reported that a short circuit occurred in one of the feeder cables leading to the Buss Bar. Power flowing through the 'fault' created intense heat which burned off the insulation covering the cable. The oily substances in the cable were volatilized, creating a powerful gas, which so reduced the insulation effectiveness of the other cables that short circuits occurred in five of the six sections. The gas was exploded by the crackling arcs of electricity.

Concrete walls blew out like paper, copper bars were burned off and

twisted, steel rods burned like candle wicks. As one writer put it, 'Hell Had Broken Loose At Hell Gate!' With power and light gone, an emergency conference was held at the city hall. All available police and radio cars were dispatched to the northern part of the city to prevent looting, riots and traffic snarls in the darkened areas. Twenty police stations were without lights or power, their teletype systems and radio cars helpless. Traffic lights were dead. Two hundred and fifty Department of Park trucks were rushed to important intersections to train their headlights wherever they could be of use.

Thousands of flares were placed along park driveways to guide cars and protect citizens from thugs and attackers. On Broadway the streets were jammed solidly with a tangled mass of honking cars, unable to make headway. The cold January rain fell in a drizzle, turning the streets to sheets of glare ice. Pedestrians could not cross the streets without the aid of police flashlights.

At the Parkway Hospital, an emergency administration of oxygen was given to a six-year old boy critically ill with bronchial pneumonia, two doctors working by the light of matches for nearly one hour. An emergency gall bladder operation was performed by the light of candles and a plumber's flashlight. Up to midnight, the nurses made their necessary rounds by the light of candles and matches. It required no great imagination to picture the danger of fire and panic.

At St. Elizabeth Hospital a delicate eye operation for glaucoma was completed entirely by flashlight. While at Columbia Presbyterian Medical Center a newly born babe first saw the light of day in total darkness.

The New York Foundling Hospital was having its moments. It was bathing time for many of the babies and

scores of them started howling simultaneously. Nurses groped and collided with each other in their desperate search for matches and flashlights. Elevators were stalled and could not be used to carry food, patients or doctors.

Refrigerators, which kept the bacteriological test tubes at constant temperatures and the food and milk from spoiling, stopped operating. Radios, which might have kept the patients calmed, went dead. Fear of fire kept every one in a cold sweat.

—But Three Short Days Apart’

Gas had accumulated under the streets as the overloaded cables burned out and manholes blew sheets of flame skyward with a roar that could be heard for miles. Bakers, commencing their night baking for the next day's goods, found themselves helpless as the electric blowers to the ovens could not be operated. The telephone company experienced its share of the chaotic scene, as seven of its exchanges were disrupted. The rest were swamped by more than 500,000 extra calls from those trying to find out what had put New York in darkness and by the frantic efforts of families trying to contact their members.

Hotels and apartments, ranging from 25 to 50 stories, were crippled. They found themselves without water, refrigerator or elevator service. There was no electricity to keep their oil burners going. More than 80,000 movie patrons sat in the darkened theatres, expecting the show to go on. They were finally given refunds. Amateur and professional pickpockets were having a Roman Holiday in the department stores. The managements finally dismissed the clerks and closed up shop. There weren't enough candles to supply one-tenth of the demands, and the price of candles rose to as much as fifty cents each.

Thugs were having an easy time of it as their victims could not identify them. Below ground in the subways, tens of thousands were trapped in the stalled trains; the ventilation system stopped functioning and the air became stifling. Yet the trainmen dared not permit the passengers to walk to the nearest station. It would mean death to any who stumbled against the third rail if the power were to come on suddenly. Later, as power was partially restored, the trains slowly proceeded to the stations. The passengers swarmed out into the still darkened platforms which were jammed with those who sought safety from the darkened streets above.

Police tried to keep people from entering the blackened subway stations. Entrances were roped off. Men and women fought back. They insisted on trying to slip by and enter the already jammed subways. They were told there had been a power break and the subways were not running. One persistent dumbhead said:

The subway not running? Nonsense! It's never happened before, has it? Well let me by or I'll report you.

Engineers To The Rescue

Back at the Hell Gate Station, the technicians worked feverishly. The right men were in the right places, and by 5:15 p.m. had most of the disabled Buss Bar working so it could distribute power again. The biggest problem was still to be solved. How to get that power back gradually to the northern half of Manhattan. An electrical system is stopped easily enough but not so easily started up again. Like a stalled car, it must be started up gradually. You can't put a stalled car in high and give it the gas. She'll just stall again. Similarly with an electrical system. When the lights or

radio go off, it is not customary for people to turn off their switches. When the power went off at Hell Gate, hundreds of thousands of light, radio, refrigerator and other types of switches were left closed. These acted in similar capacity to full throttle of the stalled car. When the power was put back on with all these closed switches, the system stalled.

Fuses blew out, transformers burned out, cables melted and manhole covers exploded to the sky. At the sub-stations, the switches tripped out automatically. Three thousand additional Edison men were hastily called to go into the darkened basements of buildings and unscrew fuses and pull switches wherever they could find them, so as to pull down the load.

In an attempt to get the power back on, so many fuses were blown that the total available supply of the company was used up and emergency calls were sent to unaffected counties, and even these were insufficient. Telegrams went out to fuse equipment manufacturers to put on a night shift and rush delivery. By dawn, power services were restored to normal. Electrical energy was again flowing over the lines of New York City.

The Storm Signals Are Up

New Yorkers had temporarily experienced chaos. One writer reported that New York had found out that it was the most vulnerable island on the Continent. He missed the obvious fact that **ALL NORTH AMERICA IS PUT TOGETHER THAT WAY!** This Continent is a high energy converting mechanism. Our present American civilization and the existence of 150 million Americans is made possible **only** by the rate at which we in America convert energy. Without this and the necessary industrial metals and other natural resources, our American

Way of Life could not survive regardless of whether the form of government were republic, communist or corporate state fascism.

A major disruption of the flow of energy would, within a period of thirty days, place the lives of 90 percent of the population in jeopardy.

For eight years prior to our entry into the present war, Technocracy warned the people of America that the indicators which it studied were flashing 'Danger' and warning that our entire social mechanism was in oscillation. A reading from one of these basic industrial indicators, 'Pig Iron Production' may be enlightening. (Ed. Note: See chart on page 20). The first major oscillation occurred in 1893. From peak to trough, the drop in production was 27 percent.

The second occurred in 1908. That drop was 38 percent. The next oscillation in 1921 dropped 57 percent. From the highest peak in 1929, the drop was 79 percent. As production reached a new high after each depression, the succeeding drop was 30 percent greater than the one preceding it.

In 1929, pig iron production was approximately 46 million tons; last year's production was 90 million tons. In 1929 we could not sustain our much smaller rate of production and the resulting down sweep took us to within 21 percent of complete shutdown. There is no known method within the framework of a Price System that can sustain the present high level of production. It is not possible in a Price System to stabilize a 'Boom.' All 'Booms' have ended in depressions.

The deficit spending of the U. S. Government has kept us from hitting bottom since 1929. We are living on borrowed time. The combined efforts of party politics and corporate enterprise proved incapable of raising the level of employment to that of 1929.

New Tools For A New Job

Only the pressure of a total war was able to accomplish what the dominant controlling interests of America could not do. Total War provided a high level of production and full employment. Clearly then the close of the war will most probably bring shutdown and widespread unemployment. Consequently, the Peace is feared more than the war. We were totally unprepared for the war. Today, we are equally unprepared for the peace.

Will the downward oscillation at the close of war be 30 percent greater than 1929? On the basis of past experience and observation of the trends, this is the most probable. Our present controlling devices were incapable of stabilizing our social mechanism when the problems involved were only half the magnitude. How can they cope with this larger problem? This is the crisis with which America may be faced! It must be averted. Yes, the danger is real. The lights could go out!

It was the knowledge of these factors and trends that prompted Technocracy Inc. to design a new set of controls that were in accord with these physical realities. It is presented to the American people as Technocracy's Total Conscription Mobilization for Peace. The stability of our internal operations must be maintained. The unity of the population must be achieved, in order that the transition from war to peace be accomplished in a smooth and orderly manner.

The specifications of Technocracy's Mobilization for Peace are not the desires nor wishes of the Technocrats. The specifications are the result of the requirements arising out of the problem. The program proposes equality of sacrifice for all, based on the same standards of food, clothing, medical

attention, dependency allowances, etc., granted those serving in the armed forces. Total Mobilization of Men, Machines, Materiel and Money, with National Service for All and Profits to None is a part of the specifications dictated by the march of events.

Do you wish to keep the lights of America glowing? Then you must realize that this is not the responsibility of the Technocrats alone; it is the responsibility of every truly patriotic American.

His Master's Voice

The alternative is implied in this editorial report of the 'Hell Gate' incident (*New York Times*, week of the Hell Gate failure):

The incident carries with it a striking social lesson particularly in a week when technical societies are celebrating the 200th anniversary of J. Watt's birth. During most of the 19th Century energy was generated individualistically by thousands of engines that were the lineal descendants of the first mine pump that Watt designed with a separate condenser. Now energy is produced in central stations and shot hither and thither over vast regions. Moreover, energy can be pooled. The New York Edison draws upon the electrical resources of its own stations and those of the Niagara Hudson Company. It is the modern mass character of energy that is driven home by New York's mishap. A short circuit and the organic life of a great city is slackened for a few hours. Back we drift to the 18th Century, to burn candles and to realize what we owe to the physicist and the engineer who have made energy collective and who transform the city into a

blaze of light when the sun goes down.

How utterly dependent we are on the engineers! They and the scientists hold us in the hollow of their hand. How many of them are there? 100,000 . . . a million . . . who knows? They constitute a new ruling class. Destroy them and the country would be laid low. Disease would decimate us . . . transportation would be impossible . . . telephone and telegraph would be silent . . . starvation would stalk in the cities . . . factories would stand idle. **TECHNOCRACY?** The term is in bad odor. **BUT** there are technocrats for all that . . . **KNIGHTS NOT OF THE SWORD BUT OF ENERGY.** When the lights go out, we become aware of our leaders.

All In The Same Boat

Those who have analyzed the facts and physical trends indicating America's destiny naturally are concerned with the apathy manifested by the vast body of Americans. There are those who are convinced that due to their

strong financial condition, they can ride out the coming storm. There are those who even in periods of depression have been able to rise on the economic scale and who feel that they are clever enough to come out on top in any situation. There are those physically tough Americans who are certain that come what may they will survive and come up 'top dog.' Lastly, there are those too timid to take any stand on anything at any time.

Whichever group you may be part of, whether wealthy or poor, clever or dumb, timid or tough, you will have no edge. We'll all sink or swim together. It will require all the collective intelligence we can muster to prevent America from committing mass suicide. Only one organization on this Continent is designed to spread that intelligence, *Technocracy Inc.*

Not only would the adoption of its design of Total Conscription and Mobilization for Peace avert chaos but it would enable us to swing into that great one lane highway to the New America of Abundance, with security for all from birth to death and a Freedom of reality, never previously experienced by any peoples in any age.

Is There a Doctor in the House?

'The national physician-to-population ratio which is considered the minimum necessary to protect civilian health is probably about 1 to 1000,' says a fact sheet on rural health and sanitation, issued by the U. S. Department of Agriculture. 'Individual areas are considered critical if they have a ratio of one physician to 1,500. In April, 1942, there were 16 rural States that had less than one active private practitioner for 1,500 people in 1,005 rural counties which neither included a metropolitan center nor were adjacent to counties which had metropolitan centers.

The total population of these counties exceeded 22,000,000. The average number of persons per active practitioner in these 1,005 counties was 2,015. In the same month, an equitable distribution of the Nation's available physicians could have provided one for every 937 persons.' (U.S.D.A. Clip Sheet, June 24, 1945).

New definition: 'HEALTH—a condition which, if it becomes epidemic, would be fatal to doctors.'—From *Everybody's Digest*, Aug. 1945.

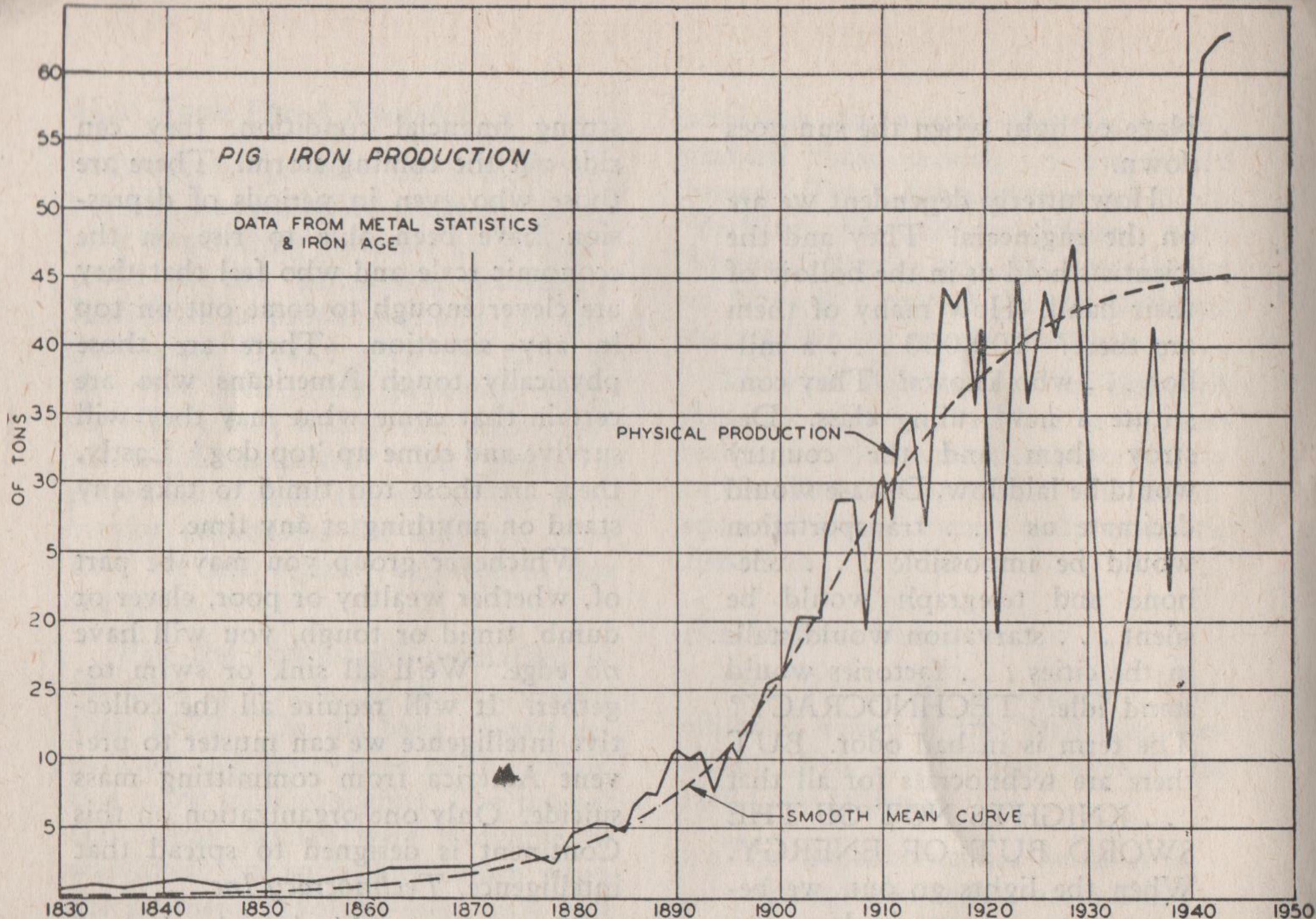


Figure 2: From Technocracy Study Course Book

The jagged curve of pig iron production. Observe oscillations. From peak to trough in 1893-1894 was a 27 percent shutdown, in 1908 it hit 38 percent, in 1921 it was 57 percent and in 1933 about 79 percent. Each oscillation was 30 percent greater than the preceding one. Note the break in 1938 which was halted by a resumption of government spending. This phenomenon shows up also in ton-miles of revenue freight hauled, in automobile and coal production, in other fields and in total use of energy.

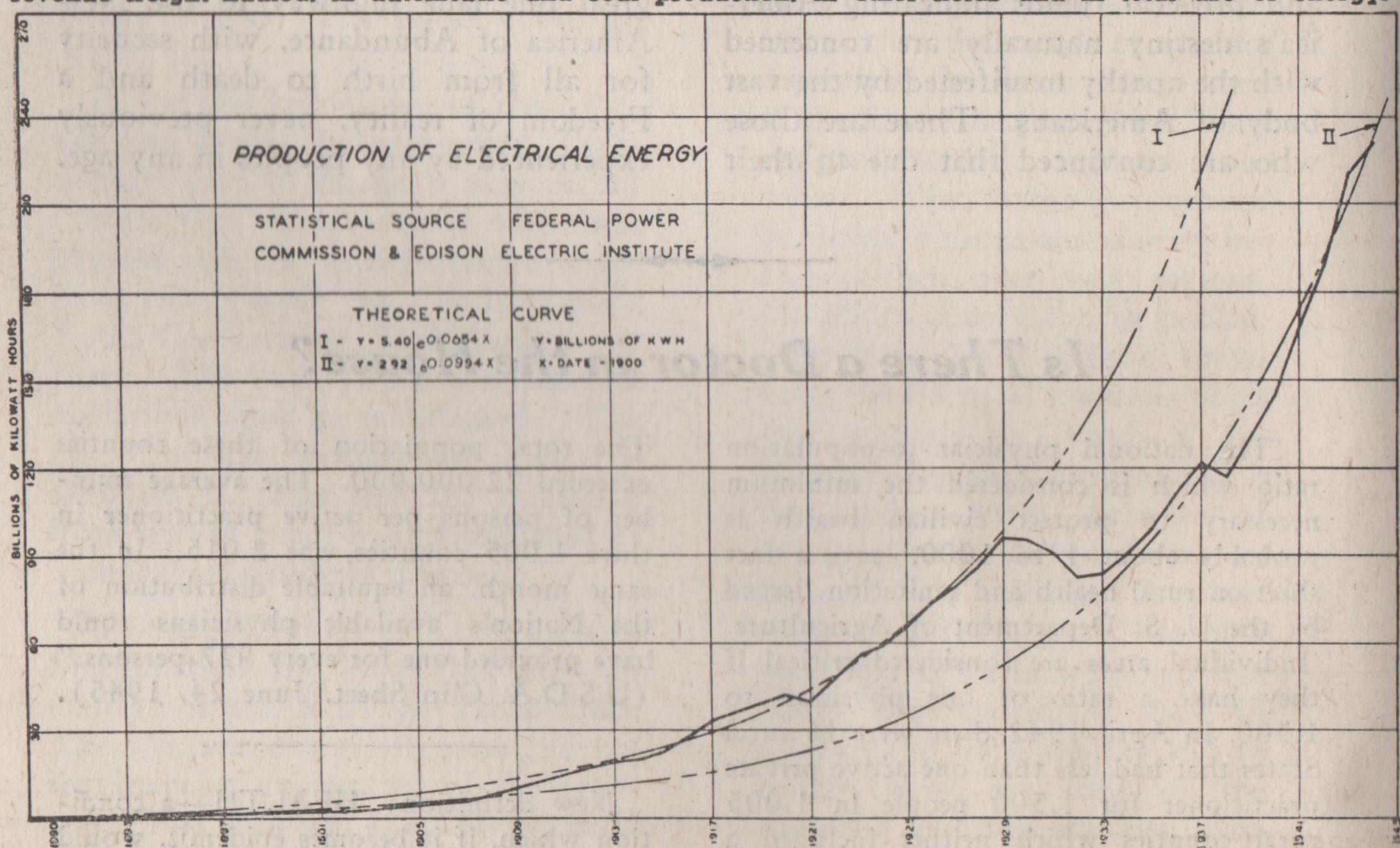
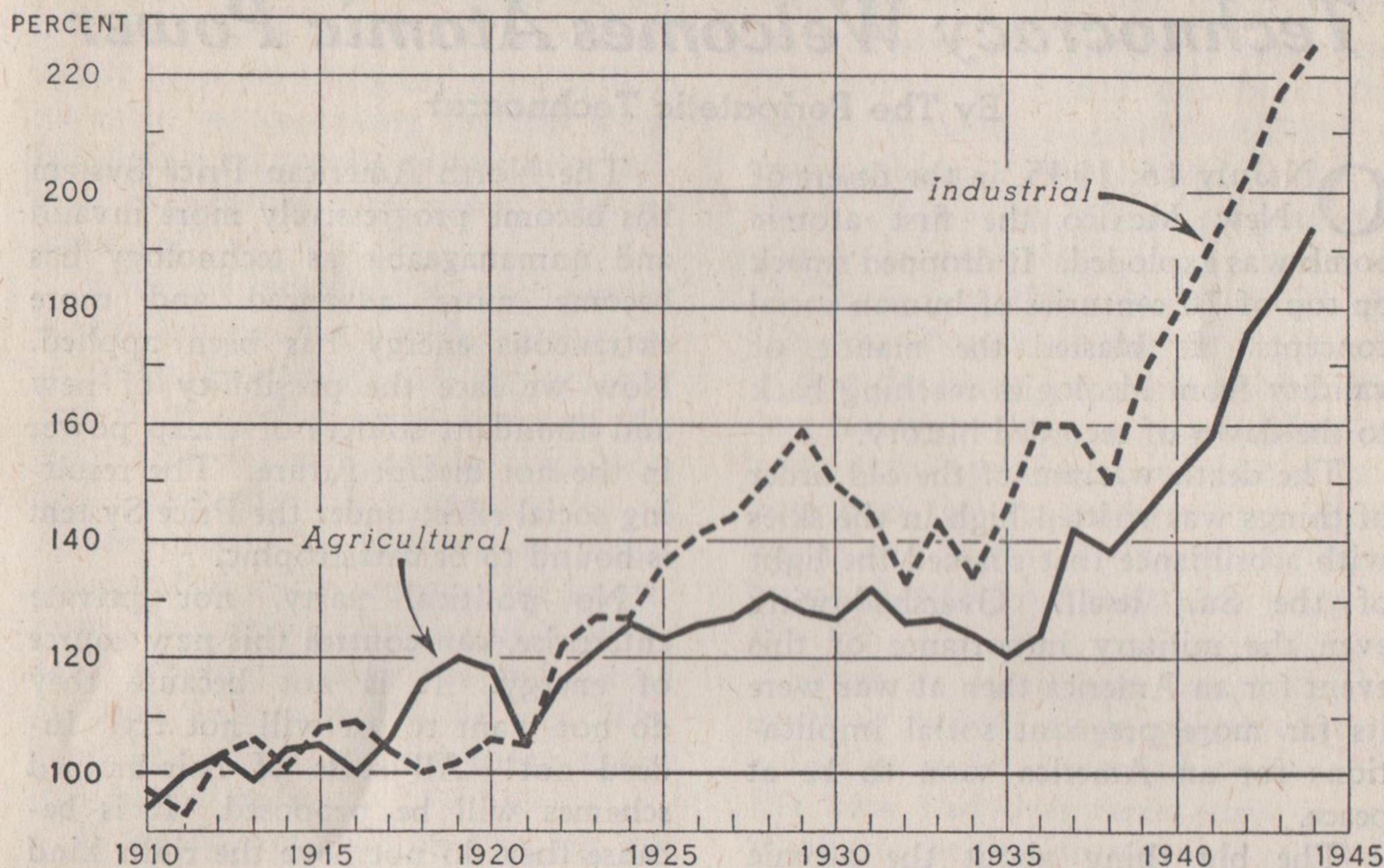


Figure 3: By Research Com. 8342-1

Here is the same oscillatory characteristic of unbalance again. Note the dates in the downward drops in power production. Notice especially the break in 1937-1938. Volumes have been written to explain it away, but there it is. As shown, since 1890 there has been a tremendous increase of energy input into social mechanism. Just a few kilogram-calories more per capita and the ancient Price System will oscillate itself into collapse. We must prepare. There is a scientific design ready.

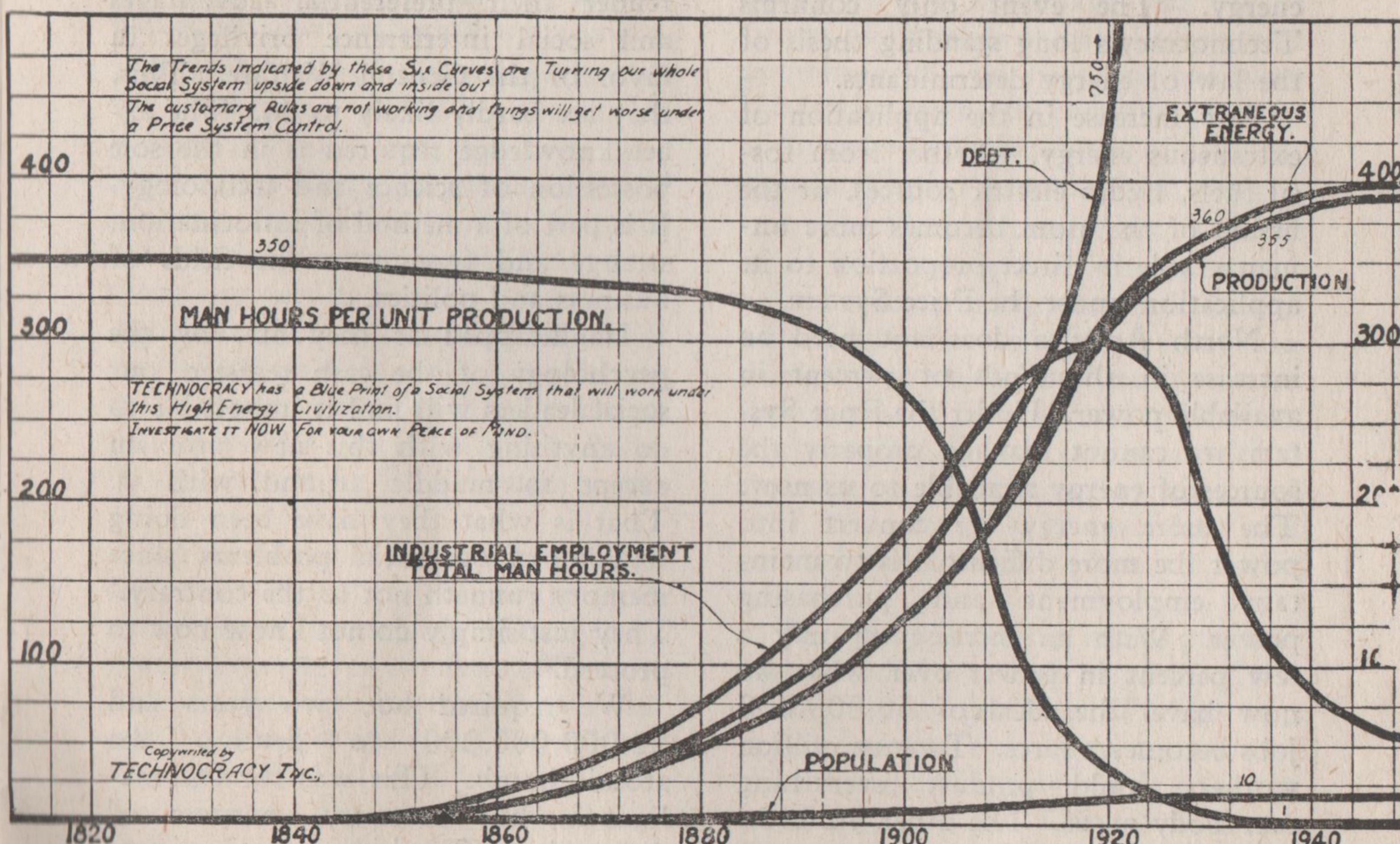
PRODUCTION PER EMPLOYEE: AGRICULTURAL AND
INDUSTRIAL, UNITED STATES, 1910-44
INDEX NUMBERS (1910-14=100)



U. S. DEPARTMENT OF AGRICULTURE

NEG. 45217 BUREAU OF AGRICULTURAL ECONOMICS

Here is the primary effect of energy and technology. Man-hours per unit are reduced, so production per employee rises. This spells more production with less man-hours and purchasing power. The oscillations of 1921, 1933 and 1938 show up here also. The only way to produce abundance is to employ more technology and energy and less toil. Under Price System controls this leads to catastrophe.



Technocracy's Basic Chart
Here is the physical history of North America from 1812 to 1948. It was drawn prior to World War No. 2, which has altered the trends since 1940 to some extent. For a complete explanation of this chart, consult the TECHNOCRACY STUDY COURSE BOOK. Man-hours per unit of production must decline. This is the handwriting on the wall for the Price System. Mercantilism is dying. Long live technology!

Technocracy Welcomes Atomic Power

By The Peripatetic Technocrat

ON July 16, 1945, in the desert of New Mexico the first atomic bomb was exploded. It dropped smack on top of 70 centuries of human social concepts. It blasted the mantle of validity from ideologies reaching back to the dawn of recorded history.

The death warrant of the old order of things was written high in the skies with a brilliance that shamed the light of the Sun itself. Overshadowing even the military importance of this event for an America then at war were its far more pregnant social implications for an America soon to be at peace.

The big thing about the atomic bomb is that a new source of energy has been uncovered. Technocracy welcomes this new addition to America's already abundant supply of extraneous energy. The event only confirms Technocracy's long standing thesis of the law of energy determinants.

Any increase in the application of extraneous energy, whether from fossil fuels, hydro-electric sources, or the fission of the atom becomes more unmanageable in direct proportion to its application under the Price System.

North America does not need an increase in thousands of percent in available power. Under the Price System we cannot manage properly the sources of energy available to us now. The more energy we convert into power the more difficult it is to maintain employment and purchasing power. With an increase of only a few percent in power over what we now have, the ideal of 60,000,000 jobs becomes a farce. Twenty million workers could produce everything everybody needs. The other 40,000,000 jobs become unnecessary to provide, and impossible to maintain.

The North American Price System has become progressively more invalid and unmanageable as technology has become more advanced and more extraneous energy has been applied. Now we face the possibility of new and abundant sources of cheap power in the not distant future. The resulting social effect under the Price System is bound to be catastrophic.

No political party, nor private enterprise, can control this new source of energy. It is not because they do not want to, or will not try. Indeed not! All sorts of hair-brained schemes will be proposed. It is because they do not have the right kind of good will, plus the exact knowledge to go along with it.

The right kind of good will would require that business and politics surrender their preferential advantages and social interference privileges in favor of the General Welfare. This, they are hardly likely to do. The exact knowledge required is in the sole possession of science and technology. It is part of a method of ratiocination, strange and foreign to the fields of business and politics.

Handicapped as they are, by the psychology of the cash register, our social leaders will find it impossible to do anything with this new problem except to muddle around with it. That is what they have been doing with all of our social problems 'since memory runneth not to the contrary.' They just simply do not know how to proceed.

We required but two years and \$2,000,000,000 to develop the atomic bomb. This was for the malignant, but necessary, purpose of destruction. There is a benign possibility to the use of atomic power

also. If we really mean what we say when we speak and write unctuously about peace on earth and good will to all men, we can bring the full social beneficence of atomic power into fruition in another two years. Do we want to?

With or without atomic power, North America can banish scarcity, insecurity, inequality of opportunity and all the other social banes of the Price System, and provide abundance and a real physical democracy for all citizens now. We have the resources, the installed machinery and the know-how. It is only a question of whether as a people we have the right kind of good will to tackle the job. The exact knowledge of how to go about it is here already.

If we do not take on this big job now, voluntarily, the motivation for doing it will soon be supplied by the pressure of physical events which are approaching inexorably closer. The doing of the job may then be accompanied by much suffering and sacrifice.

The dictum of technology is that we must scrap our 70 centuries-old concepts of buy low, sell high, and keep things scarce, of production and exchange for private profit. We must reorganize our entire social structure along engineering lines to produce and distribute for the General Welfare. If we fail to do this now, the ushering in of atomic power will only hasten the inevitable social disaster being brought about by Price System methods of operation.

Today America has the psychology of a defeated nation. We act as if we are afraid of something. There is no physical reason for our fears. We have just finished demonstrating our incalculable might for war. The military victory is ours. Let us now see to it that the peace does not defeat us.

The science and technology that made our war effort successful is still

with us. We have lost much in the lives of many of our best young men. We have also gained greatly in the ability to solve mankind's oldest social problem: 'What shall we do to live?' If we can do it for war, we can do it for peace.

There is nothing to be afraid of. The significance of the atomic bomb is that the great American social problem has been thrown into bold relief against the awful fires and smoke that rose into the stratosphere over Hiroshima and Nagasaki. It is easier today to see that problem in its true perspective.

Now we are face to face with the postwar period, stark naked of any collective social design of operations. We have had over three years to get ready for the time that is now at hand. We have done nothing about it. In addition, we remember the futility of Price System attempts to solve social problems in the past. Here is the true source of our instinctive fear of the future. But while we are jittery with apprehension, we have in our very hands the means to construct a more advanced and higher form of civilization in North America, right now.

In the light of these facts, we witness the sorry spectacle being staged by our leaders in business, politics and education. The only thing they can think of to do with America's new found power, atomic and otherwise, is to turn it over to some international commission or other, or to hope and pray that man will somehow be granted the occult wisdom to use it wisely.

The great American social problem doesn't call for occult wisdom. It is an engineering problem. Technocracy states that the only way to use our scientific knowledge wisely is to apply it socially for the General Welfare. The implications involved can neither be denied nor evaded. In the long run,

science and technology will have their way, willy-nilly; or chaos will ensue.

It is up to us who did not take up arms against the foe, and for those who did and survived the holocaust, to be true to our fellow Americans who fell in the battle. They lie buried today in the well-ordered cemeteries of the old countries of Europe, in the green hell of tropical jungles, on the windswept shores of lonely islands out in the vast Pacific, or deep in the dark depths of the restless sea. Many of them will never come home again, dead or alive. It was not for them to hear the glad ringing of the peace bells, nor to join in the happy celebrations. They died to make it all possible. They died for an America that can be, not for an America that was. To

put it another way, they did not give their young lives for the old America of scarcity, insecurity and depressions. They fought for the land of the pioneers' dreams, the promised land of abundance. It is up to us to create that America, else their great sacrifice will have been in vain.

Technocracy calls upon all North Americans to re-examine the framework of the Price System social structure in the light of the new atomic power. There, plainly written, for all to read, is the handwriting on the wall. The choice is now between science or chaos. There are no other alternatives left. Think well, Mr. and Mrs. American. What are YOU doing about it?

INVESTIGATE TECHNOLOGY!

The Ghost of Juniper Ridge

"There you are. The experts are happy; they have always said "no tin" and regardless of hundreds of tin assays proving them liars; regardless of years of fighting, especially around Juniper Ridge in Oregon, the experts have taken the bit between their teeth and refuse to see any tin ore in these United States.

"They are no doubt very happy to have the backing of the elite "E & M J" to prove that there is no tin ore in the United States.

"I hereby contend that the editor is either an old fossil, or in the pay of a vicious "good neighbor" tin cartelized group of thugs who want to control all tin production and prices, and also kill any attempt to prospect or mine tin ores in these United States. But nevertheless *there is good tin ore in the United States . . .* (From column 'Getting Down to Bedrock With the Old Rockhound,' on editorial page of *The Mining Record*, Denver, Colo., Nov. 30, 1944). Ed. Note: See *The Technocrat* for August, 1941, 'The Great Tin Conspiracy.'

"We could have a national money income of \$300 billion a year and still be starving to death for lack of food. In 1923, just before the mark broke, the German national income was in the trillions, but the people were destitute, for their money would not buy anything.

"It is the same way with jobs. Full production and full employment . . . are not synonymous. The old WPA provided a great many jobs, but very little production. . . . it is entirely possible for us to have 55 or 60 million persons employed and yet have a declining standard of living."—Sen. Kenneth S. Wherry (Nebr.) Jan. 18, 1945 (as quoted in *Vital Speeches of the Day*, Feb. 15, 1945).

Although originally designed to produce 80,000 tons annual capacity, the Institute, W. Va., butadiene plant is now delivering butadiene at the rate of more than 100,000 tons a year. Eight-tenths of a short ton of butadiene is required to produce one long ton of Buna-S synthetic rubber.



From John Atherton's Painting In The Universal Match Collection

Paleolithic man discovers fire. How? Where? When? Who Knows? The occurrence is lost in the mists of antiquity. The fact remains. The discovery and control of fire marked man's first success in the diversion of extraneous energy to his own uses. It set him apart from the lower animals. Paleolithic man was caught up in the resistless processes of change. He advanced one step. It's a long way back to the old Stone Age. But that is where the slow tortuous march of technology began.

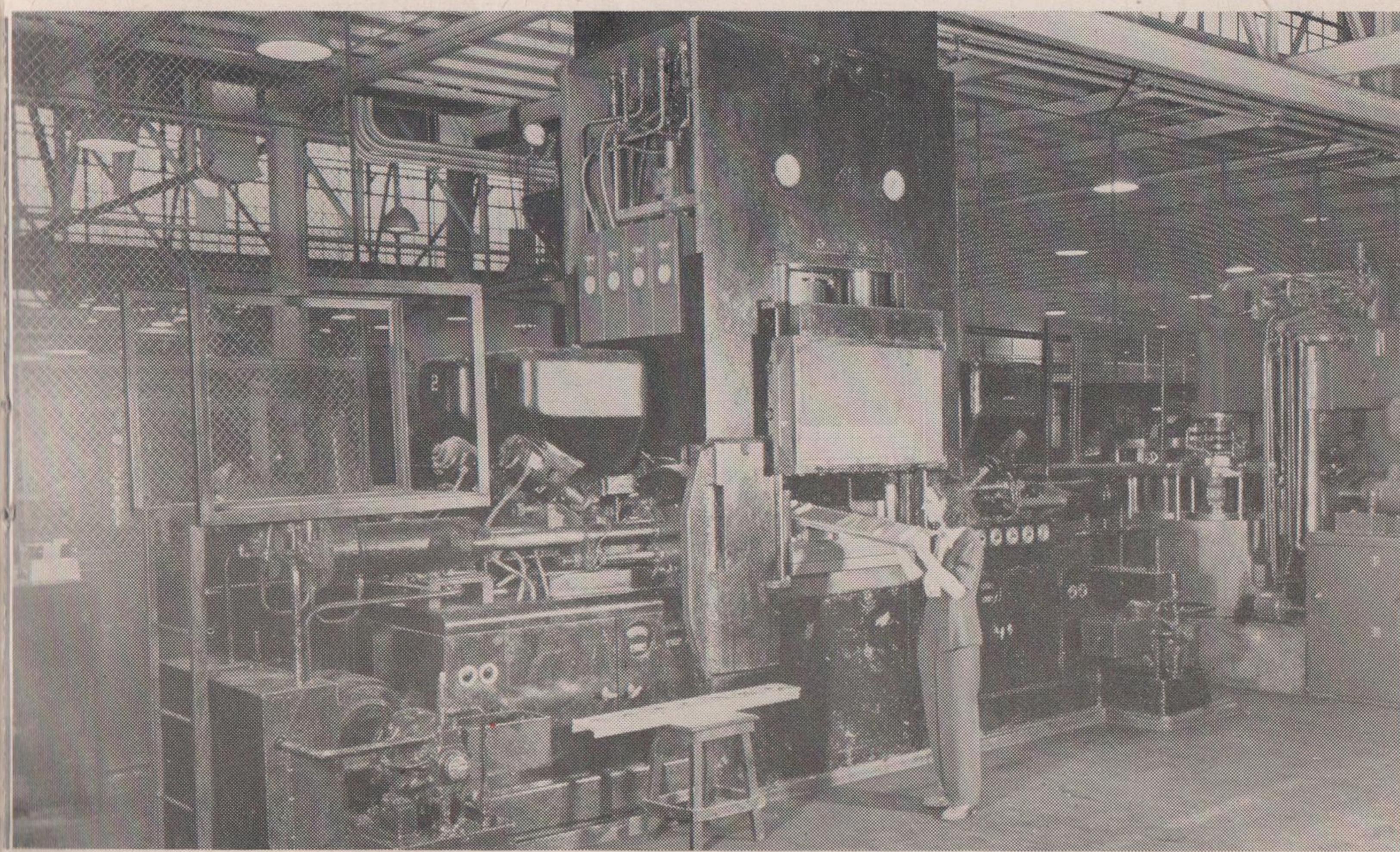
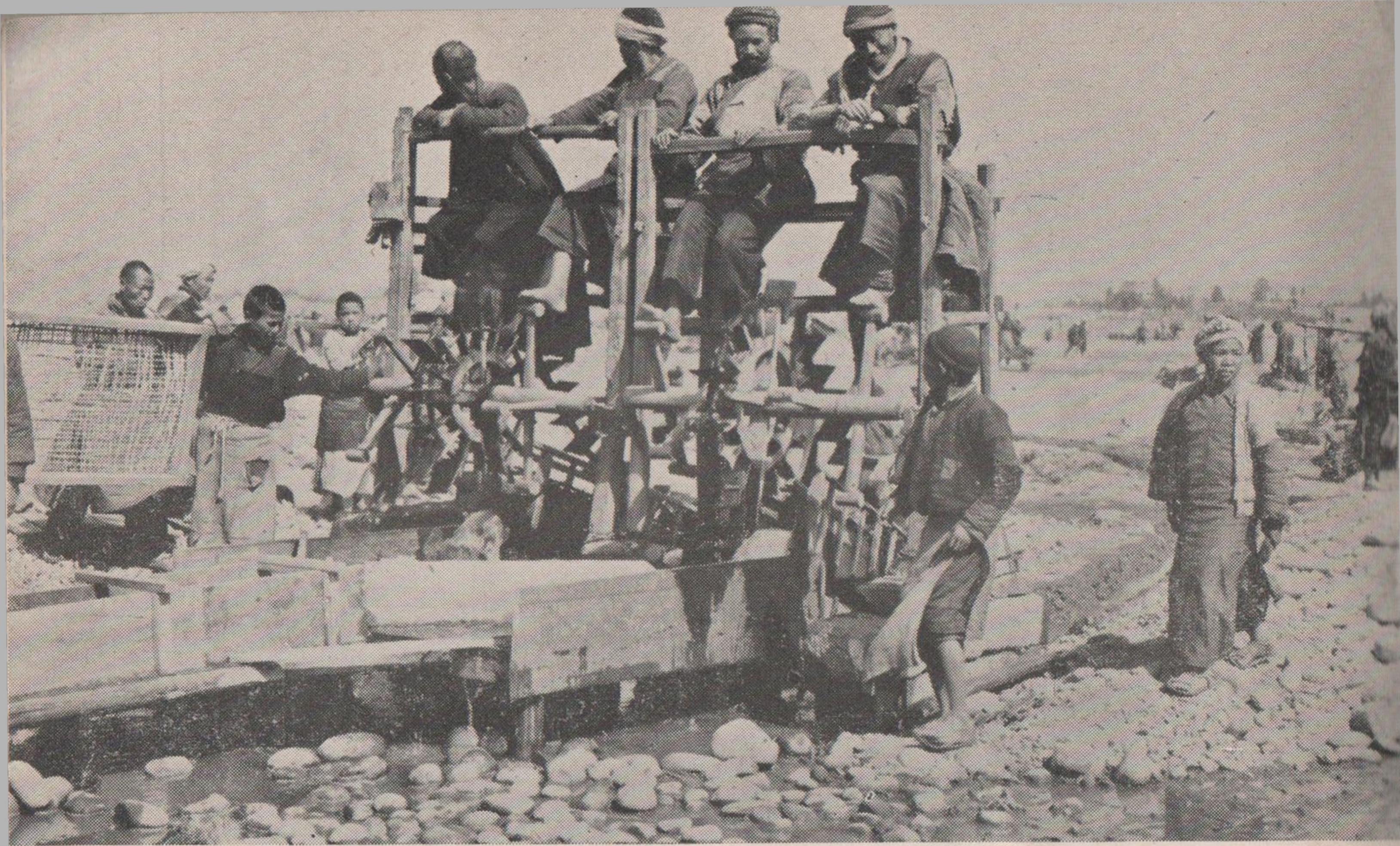


Photo: Courtesy Ford Motor Company

From a savage squatting beside a fiery stream of lava, to this 500-ton fast traverse is a far cry. The difference is advanced technology. This press riveted fin bulkheads for B-24 Liberators. It completed two spars and drove 270 rivets in one operation requiring 5 minutes. Previous methods took 50 minutes. Press riveting eliminates warpage and greatly improves sheer strength. The latest war is over but the latest advances in technology remain. They represent a net gain from the war.



Official Photo U. S. Air Forces

Building B-29 bases in China. From here it is not such a far cry back to the Stone Age. The shorter distance is testimony to the voluminous philosophy and scanty technology of the Orient. The four-coolie power is muscles here does not even equal $\frac{1}{2}$ hp. of mechanical energy. Philosophy and morality are not the basis of civilization. They are but evanescent opinions. Civilization is rooted in physical factors. It is nowhere so modern as where the most technology and extraneous energy are used.

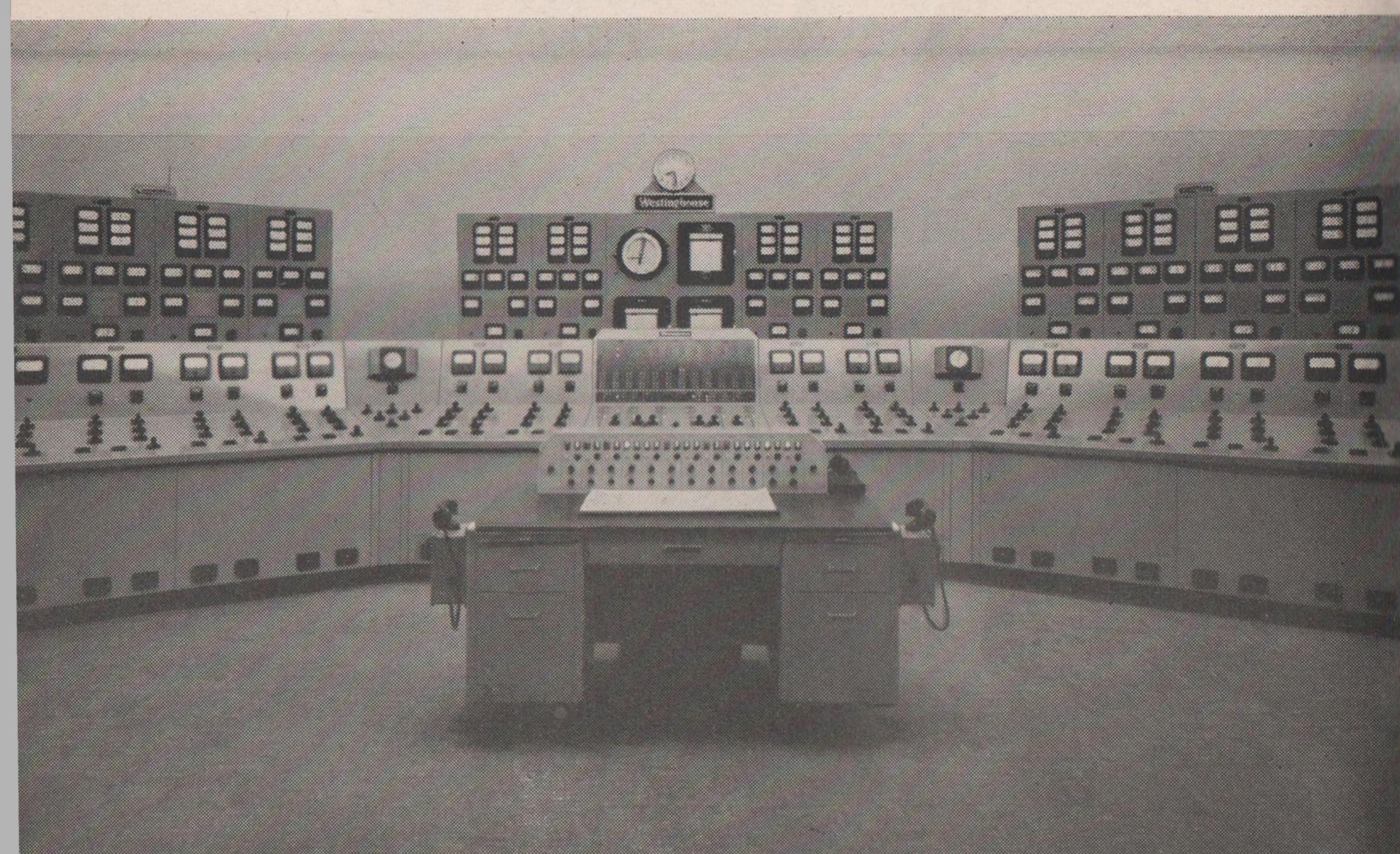


Photo: Courtesy Aluminum Company of Canada Ltd.

This is what we mean. Here is the switchboard in the control room at Shipshaw Plant No. 2, on the Saguenay River. With eight 100,000 hp. and four 85,000 hp. units, it is the world's largest single concentration of hydro-power. Control is simplified and coordinated into a one-man job. No coolie muscles, no toil, no philosophy. This is the application of physical laws to reduce man-hours of labor. That is the yardstick of 'progress.' How the Price System perverts it is another story.



Photo: Courtesy Federal Power Commission

Winds have always blown over the earth. It was not until the 12th century that the first crude windmills appeared. This proposed dual electric generator perched atop a 500-foot steel tower is designed to produce 6,500 kw. in a 28 mph. wind. Current output is automatically regulated to the wind velocity. There is a 1,000 kw. unit in operation on Grandpa's Knob near Rutledge, Vermont. Wind energy is free. Construction of units is simple, operation automatic and maintenance cheap.

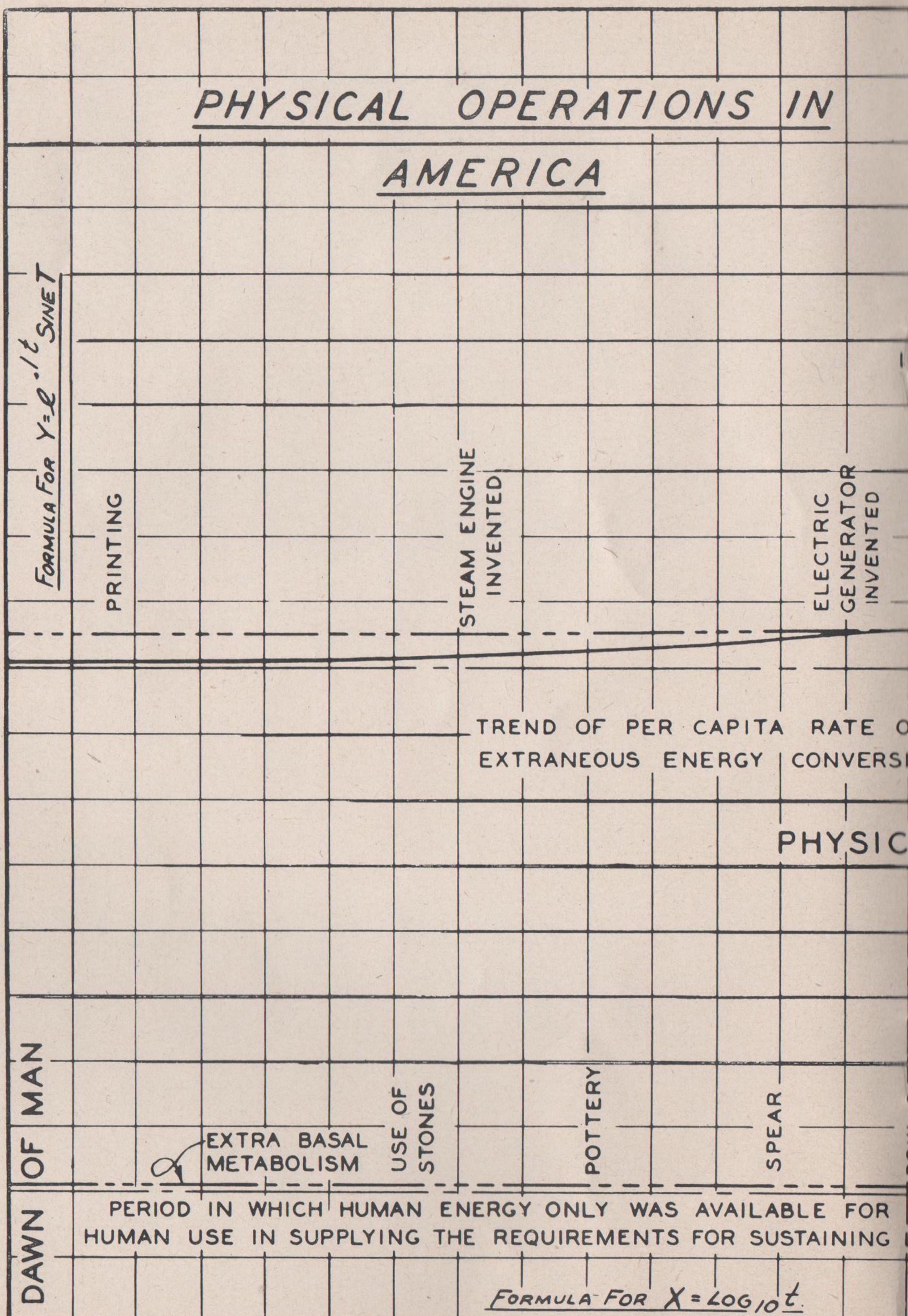
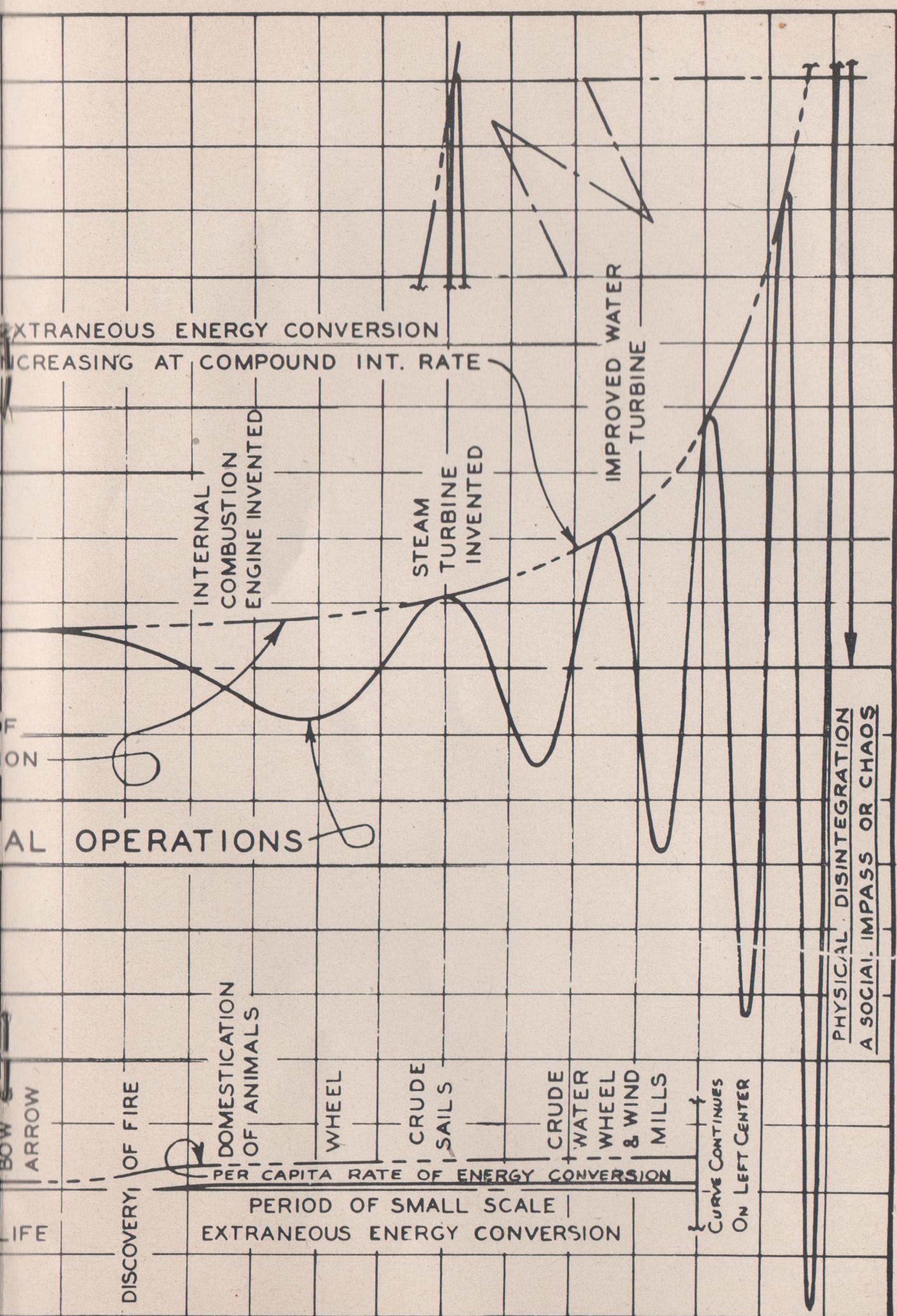


Figure 1: By Research Com. 8342-1

This chart is divided into two parts. The lower part shows the non-oscillatory period of human society prior to the use of extraneous energy on a large scale. The lower part shows what has happened since then. The peaks show high points of production. The troughs represent shutdowns. Oscillations of this type are due to unbalance between production and distribution. A mercantile Price System is unable to distribute purchasing power so that the products of industry can be bought back on a balanced load basis. With advancing technology productive ability outruns purchasing power.



With time, more technology and increased input of energy the unbalance becomes too great, a break occurs and production shuts down. An upward swing is started again by redistributing purchasing power. Soon the phenomenon re-occurs. The forces acting here are cumulative and self-regenerative, resulting in increased amplitude and frequency of oscillations. If continued, this process can end only in a complete shutdown. A scientific system of functional, non-price, social controls is required to operate a high energy social system on a balanced load basis between production and distribution.



Photo: Courtesy Automotive Council for War Production

'Bowed by the weight of centuries he leans.—The emptiness of ages in his face.' For thousands of years the productive ability of man was geared down to the power output of the human body. His cultural and social institutions also became geared to the age-old concepts of toil and scarcity. Today our productive ability is astronomical. Our social controls are still geared to those ancient concepts. Verily, they are full of the emptiness of the ages, ripe fruit of the Price System.

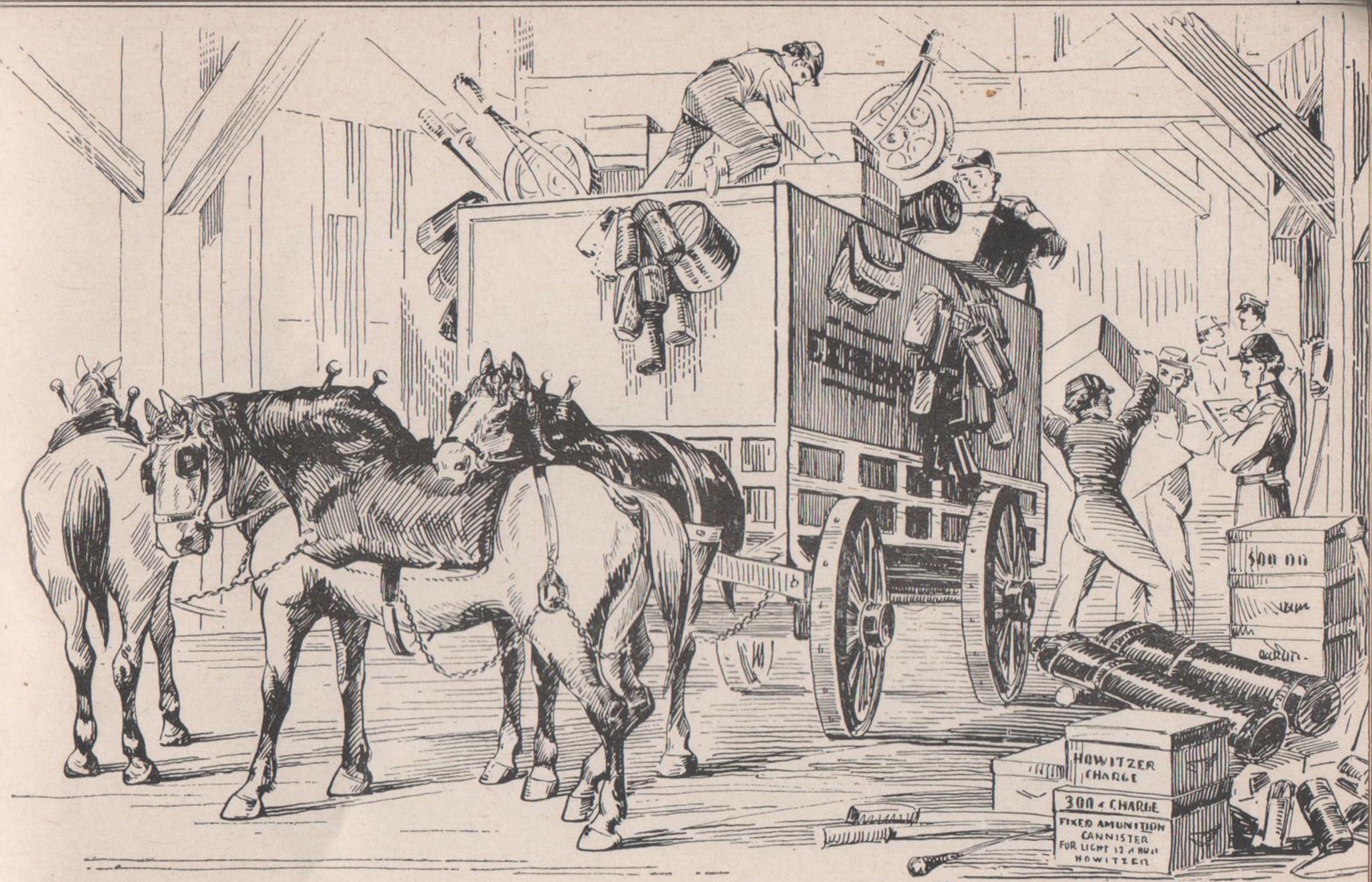


Photo: Courtesy Railway Express Agency

In 1861 war supplies were hauled by this large horse-drawn truck. The Price System was just entering a great period of expansion borne on the growing wings of technology. It was not compulsory to solve social problems then. We could always conceal them in penitentiaries, insane asylums, potter's fields and legislative pigeonholes. Today we are still at the same old game. It won't work any longer. Social problems must be solved now. Technology is the Nemesis of all the time-tried rackets.



Photo: Courtesy Pennsylvania-Central Airlines Corporation

In 1945 many war supplies are sent by air. An electrically driven endless belt loads express, mail and luggage with a minimum of man-hours. By contrast with the preceding picture this one is a scene from a different world. And, so it is! North America has entered a new age. Upon our recognition of this fact rests our collective security. We are at the end of manipulation and obscurantism. The issue is clear cut. Technology will out, or else we go back a thousand years to a new dark age.

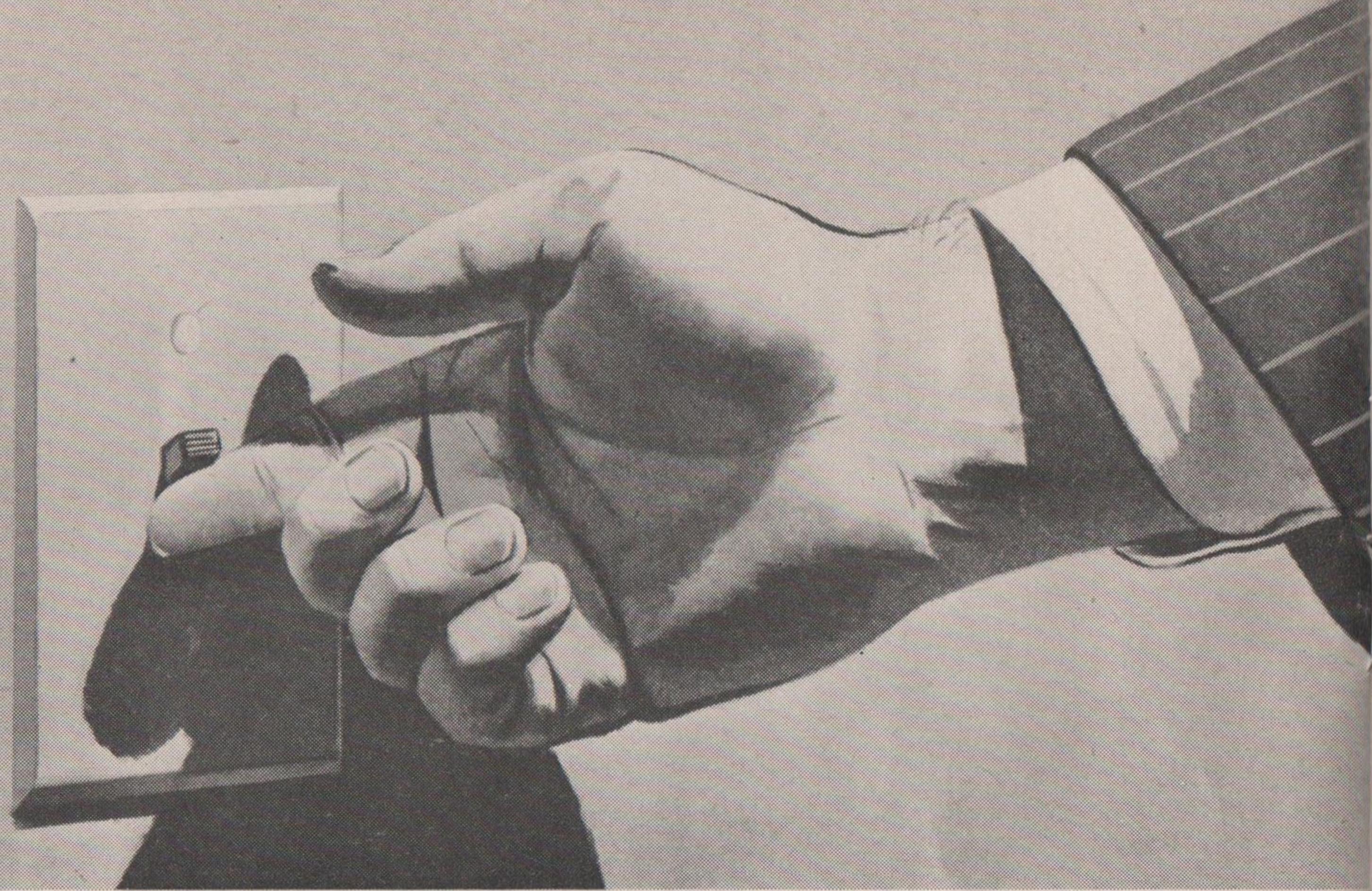


Photo: Courtesy Joshua Hendy Iron Works

The electric switch, symbol of the Power Age. Flick it on and the lights go up; the wheels turn. Snap it off and flow lines stand still; the lights go out. The switch knows not of philosophy, politics or business. It does not hear our prayers nor heed our yearnings. It just operates. That is physical law. Paradoxically, power will do everything we have always wanted done if we operate our social system by its design. In that fact is America's only salvation from the emptiness of the ages.



Photo: Courtesy Power Magazine

The Four Horsemen of the Apocalypse: War, Famine, Pestilence and Death. They have ridden over the earth time after time. Here, Philip Wylie's Fifth Horseman, full of pity, rides ahead to warn man of their coming. He failed, for pity is not enough. As long as the Price System exists, the Four Horsemen will ride again and again under its scourging banner. Science dictates a total break with the dead past, a new design of social operations. We had better listen. INVESTIGATE TECHNOCRACY!

The March of Power

By Research Committee 8741-1

One asks what was the total power consumption of the U.S.A. in the year 1937, eight years ago? It was of the order of 25,957 trillion B.T.U. of heat energy, according to the U. S. Bureau of Mines. What are the Bureau's figures for 1944, the all-time high year of America's war production? . . . 35,707 trillion B.T.U.

To translate British Thermal Units into the language of the layman, this amounted to approximately 14.4 trillion horsepower-hours, *1-2/3 billion hp. at work on the average every hour of the day and night*, most of it burned in the engines that drive our trains, factories, autos, ships, tractors, planes, mines and power stations. As the Price System's controls falter in

the ensuing months, the horsepower hours will probably decline rapidly.

In the largest industrial (installed factory hp.) city of the world, the Chicago metropolitan area, this energy conversion from coal, oil, gas and waterpower amounted to about 100,000 hp.-hours per inhabitant for the year. (1944 estimate, based on 1943 figures given by Robert Brinton Harper, engineering vice-president of the Peoples Gas, Light & Coke Co., Chicago, at Midwest Power Conference April 13, 1944.) When it is realized that at best an adult human can convert food (fuel) into work at the rate of less than 1/10 hp. per day, then these figures indicate how closely tied Americans are to the March of Power.

Annual Supply of Energy from Mineral Fuels and Water Power in the United States—1944

Bituminous Coal	16,244,000,000,000,000	B.T.U.
Petroleum	10,067,000,000,000,000	"
Water Power*	3,989,000,000,000,000	"
Natural Gas	3,654,000,000,000,000	"
Anthracite Coal	1,753,000,000,000,000	"
Grand Total	35,707,000,000,000,000	"

* (At constant fuel equivalent of 4.02 lbs. coal per kw-hr.

Growth of energy use between 1934 and 1943. Note the drop in 1938 which caused the 'recession.'

1943:	33,817,000,000,000,000	"
1942:	31,995,000,000,000,000	"
1941:	29,549,000,000,000,000	"
1940:	27,327,000,000,000,000	"
1939:	24,620,000,000,000,000	"
1938:	22,765,000,000,000,000	"
1937:	25,957,000,000,000,000	"
1936:	24,367,000,000,000,000	"
1935:	21,615,000,000,000,000	"
1934:	20,413,000,000,000,000	"

—Source: U. S. Bureau of Mines.

Annual Supply of Energy from Mineral Fuels and Water Power Produced in Canada . . . 1944

Water Power	2,025,000,000,000,000	B.T.U.
All Coal	462,186,000,000,000	"
Petroleum	60,000,000,000,000	"
Natural Gas	49,450,000,000,000	"
Grand Total	2,596,636,000,000,000	"

Measured on a per-capita per-day basis, the extraneous energy consumption in the U.S.A. in 1944 was approximately 180,000 kilogram-calories. As Canada's total power consumption last year, based on fuel and waterpower figures given in *Canada-1945*, was close to 2,600 trillion B.T.U., the per-capita per-day energy amounted to about 148,000 kg. calories. Both countries' conversion of energy reached new historical high marks, and would have been higher if not for greater efficiency in the use of fuels and hydro-electric power in recent years.

'Power is the steam roller of technology. Technology is the social mechanics of the Power Age. The wish-fulfillment of the masses, the sincerity of the reformer, the enterprise of the politician, the vision of our intellectuals, the pathology of our economists, are but gestures of futility,

straws in the wind, in the face of the march of power.

The soldier and the seer, the politician and the priest, the business man and the banker have ruled human society in every age until now. Technology in its march of power is serving notice on all of these, chiseler and sucker alike, that their day is passing, that a new order is clamoring at the gates. As technology moves up more power the gates will go down, and a new leadership of men and things will be given to the world. This leadership will spring from those of the trained personnel of this Continent who have the courage, capacity and discipline to administer and direct the technological application of physical science to the conduct of human affairs.'

(Howard Scott, Director-in-Chief of Technocracy Inc in *Technocracy* magazine, Series A, Number 9, February, 1937)

Science or Business

Scientists form the only group in society which knows that the concepts and ideas by which politicians and the accepted organizers of human relations are guided are mostly wrong, based on misconcepts, old superstitions, and false institutions. Yet the scientists have left not only the administration of, but also most of the study of the administration of human life and world affairs in the hands of people who know little, and who have been trained so poorly that they care still less, about what a century of progress in the science of life has achieved. Therefore, I cannot help feeling that we scientists are more truly responsible for the chaos of to-

day than any other part of society.

Franz Verdoorn, scientist and teacher, in *Science Illustrated*, January 1945.

'This war is being fought for freedom from political oppression, not for Freedom from work. . . . The only time the laws of economics can be suspended is during a war. . . . It's easy now for anyone to get and hold a job whether or not he does it efficiently and earns his pay. That time is almost over.'—Excerpt from a full page ad of Warner & Swasey, machine tool manufacturers, in *Newsweek*, May 8, 1944.

It takes ten pounds of milk to make one pound of American Cheddar Cheese. Moral, eat your milk, and let the other guy drink his.

Primer of Technocracy

By Education Division 8741-1

The Uniform Crime Report for 1944, issued by the F.B.I., lists a total of 1,393,655 major crimes in the United States in 1944. There were 76,091 crimes against the person, listed as murder, negligent manslaughter, rape, aggravated assault, etc. Crimes against property totalled 1,317,564, consisting of larceny, burglary, auto thefts, robbery, etc. From this it will be seen that offenses against property constituted more than 95 per cent of all the crimes reported in 1944.

What's Yours Is Mine

ACCORDING to this annual report, which is the best available authority under the Price System, only about 5 percent of all crimes are crimes of the emotions or passions. The other 95 percent were committed for the purpose of getting some one else's property. Obviously, the persons committing these crimes, except in the case of kleptomaniacs, must have felt a need to acquire more purchasing power. This is a point to be kept in mind.

As a whole, crimes against property show a decrease in the last three years, 1942, 1943 and 1944, as compared to the pre-war average of 1939 to 1941, except in the case of auto thefts. Robberies declined 13.2 percent; burglaries 8.9 percent; larcenies 13.3 percent. But, auto thefts increased 15.2 percent. It is an axiom that crimes against property decrease in good times and increase in hard times. However, you may say, times have been good the last three years. So, why should auto thefts increase? The answer is scarcity. This is a second point to be kept in mind.

The total registration of automobiles has decreased by 2,365,756 in the last three years. Autos have been getting scarcer. Ergo, we have more auto thefts. Conversely, jobs have been more plentiful these last three years, resulting in more purchasing

power on the whole than in the prewar years. Ergo, crimes against property diminish. But, even with this augmented purchasing power the average man couldn't buy a new car in the last three years. So, according to the record, 97,081 of them just went out and helped themselves.

Crimes against property are a phenomenon within the framework of the Price System. The fact that they rise in hard times and fall in good times gives a clue to their motivating cause. In hard times, total mass purchasing power is lower than the usual low of so-called good times. Consequently, purchasing power as a whole becomes scarcer. This leads to crimes intended to alleviate that scarcity. In so-called good times, jobs become more numerous. Consequently, total mass purchasing power creeps a little bit upward out of its customary cellar. The need of alleviating a scarcity of purchasing power declines. As a result, crimes against property drop off.

The two main factors in the background of crime against property are scarcity and purchasing power. The relation between these two factors is the greatest single cause of this type of crime. Since any Price System must maintain a scarcity in order to remain a Price System, there is little prospect for this type of crime to decrease to any extent. Also, since no Price System can ever create a suffi-

ciency of purchasing power for all citizens, there is little prospect of help from that source. All the preaching and moralizing we can muster can do no more than make a dent in the crime total.

What's Mine Is My Own

An integral part of the Price System environment is the concept of property. In 1944 there were 1,317,564 people in out right rebellion against that concept. They have no respect for it whatsoever. The best definition of property we know of is the one given by Lawrence T. Frank of the Rockefeller Institute. It is to the effect that property consists not in a physical object, but in a mode of behavior with respect to a physical object. Another way of saying this is that property consists in what society will allow an individual to do with what he owns.

In the North American Price System, a small minority own the means whereby the great majority must live. What society allows this small minority to do with the means of production and distribution is the determinant of the General Welfare of all the people. The Price System's code of property rights with its necessary concomitants of scarcity and low total mass purchasing power is the direct cause of crimes against property. If you want to get rid of this type of crime, you must remove the cause.

Technocracy's basic postulate is that nearly all phenomena involved in the operation of any social system can be measured. We can measure crime with the yardsticks of property rights, purchasing power and scarcity. But all we can do about it under the tyrannical restrictions of the Price System is to treat the symptoms. So long as scarcity, low purchasing power and private ownership and control of the General Welfare exists, a standing re-

ward is offered to all who can steal successfully. 'Withdraw the reward and these activities automatically disappear. It is the Price System itself and not the individual human being which is (primarily) at fault.'

The only way to solve at least 95 percent of our crime problem now becomes plain. It consists in reorganizing the entire social structure along technological lines. We must remove the price tag from the General Welfare. We must abolish scarcity and low total mass purchasing power. We must alter our collective social concept of property so that it becomes the servant of all and the master of none. This implies a thorough overhauling of our entire social structure and a realignment of it along technological lines. After all, why not?

We scrapped the windjammer for the steamboat; the pony express for the telegraph; the stagecoach for the railroad; the carriage for the auto; the horse for the tractor; individual fabrication for mass production; human toil for extraneous energy, and so on. Who is there so ignorant and stupid as to say that North America will not scrap special privileges for the few in favor of the General Welfare of all citizens!

It is not only the solution of our crime problem that is involved. By itself crime is only a minor part of the social problem as a whole.

If you define crime as being an offense against the welfare of society, then the greatest criminal of all is the Price System itself. When we solve the North American social problem as a whole, the crime problem will evaporate in the same way that the night dew evaporates in the morning sun. Let's quit philosophizing about crime and get down to the bedrock of social facts. 'All phenomena involved in the operation of a social mechanism are metrical.'

Technocracy and Your Trade

Power - Production - Employment
By R. F. Novalis

It's An Invisible Army

EVEN though we produced more than ever before in the wartime peak year of 1944, didn't we also employ more people than in any previous year? This is the comment commonly heard when the subject of technology is mentioned. The two answers to that fallacy explain why it has been possible for this Continent to raise its living standards above that of the rest of the world and at the same time win a World War, for the second time.

More Americans than ever before in our history were employed in 1944, but 10 million of them were turning out munitions. The important thing is that each operative produced more than he or his father or grandfather could turn out in the past per man-hour.

Greater use was made of existing machines, more machines were built and installed and more power-producing capacity was placed in operation than in any five-year period in our entire history.

In the four branches of industry, factories, farms, mines and railroads, which produce the bulk of our output, how has greater use of power enabled Americans to deliver more per man over the years? It is an obvious fact that our muscular strength certainly has not increased at all in the past half-century, nor in the seven centuries preceding that.

FACTORIES

Back in 1880 production of commodities per wage-earner was five tons per man-year. In 1930 this had increased to 22 tons per wage earner. (Chicago *Herald-American*, August

11, 1945.) Since we employed only 16 percent more people in 1940 than we did in 1930 to produce 38 percent more goods, productivity per man in 1940 was something over 25 tons, of ships, automobiles, refrigerators, hats, steel and the other things that America uses in peacetime. (Federal Reserve Board and Bureau of Labor Statistics)

James Watt's steam engine, patented in 1769, was first used outside of a mine in 1785 when a spinning machine was powered in an English factory. One of the direct causes for the American Revolutionary War was the attempt on the part of certain industrialists to keep the steam engine, or even drawings of it, on the other side of the Atlantic away from America.

By 1890 we had about 6,000,000 horsepower of prime movers (mostly steam engines) in our factories and 4,250,000 wage earners. The last census of manufactures in 1940, fifty years later, gave us only 1-2/3 more operatives but 8½ times as much installed horsepower; 7,880,000 employees and 51,000,000 horsepower.

Random comparisons can also be made of the difference in productivity as the inevitable result of using power driven machines to do work in place of human toil. Average working hours in Massachusetts' textile plants back in 1840 were 14 per day. In 1860 at the outset of the Civil War, national average factory hours were 66 weekly. This went down to 60 in 1887, to 57 in 1907 and to 38 in 1940. In 1863 it required 18-1/3 man-hours to manufacturer a pair of men's shoes. By 1895 this had been cut to 2½ man-hours through the introduction of automatic machines.

The same trend has occurred in

'new, technological' industries. In 1920 we produced a third of a billion of electric light bulbs with 17,000 wage earners. In 1939 General Electric alone made 970,000,000,000 bulbs, but not with the 51,000 people that would have had such jobs if technology had not been introduced. Less than 5,000 people were needed to produce 970,000,000,000 bulbs. The other 46,000 persons joined the ranks of the approximately 8,800,000 unemployed in 1939. (National Conference Board data.)

A glass factory workman in 1838, just a little over a century ago, worked 12 to 14 hours a day in order to blow 216 four-ounce bottles. (*Scientific American*, September 1945). The 1945 glass plant operative doesn't blow out his lungs, he simply presses a button, and machines, devised by technologists, turn out 216 bottles that size in three minutes.

F FARMS

Tractors produce no crops. They are the prime movers which pull plows, combines, harvesters and other machines which today do the work of growing food and fiber. Between the time the Pilgrims landed in 1620 and the turn of this century, oxen and horses pulled what crude implements the pioneer farmers had.

In 1914 we had 10,000 tractors on our farms. By 1930 only 13½ percent of the farms were supplied with tractors. The 1940 census showed 23 percent of the farms with tractors. Today we have over 2,000,000 tractors and fewer people employed on the farms than in 1914.

In 1830 it took 64½ man-hours to produce an acre of wheat; today it takes 2½ man-hours. (International Harvester Co. data.)

In 1880 one-half of all the wage earners in the United States were still employed on farms. In 1940 only

22 percent of all wage earners remained on farms.

In 1942 farm crops of the nation were harvested with 26,000,000 fewer persons than would have been required if 1840 methods were still in use. (*Automotive War Production Bulletin*, February 1944). When it is recalled that total 1942 farm employment was only 10,000,000 persons, the comparison is not so startling in view of the increase in tractor use.

RAILROADS

In 1855, before the first transcontinental railroad, you would have spent 28 days crossing the United States in a coach. Today it is done by rail in less than 56 hours. The all time high of people 'working on the railroad' was reached in 1920 with 2,220,000 employed. This fell to 1,660,000 in the boom year of 1929, when nearly 10 percent more freight was carried than nine years before. This last statement signifies the change in productivity due to more efficient locomotive boilers, more automatic coal-loading and track laying machines and scores of other technological changes.

In 1944 rail freight load reached an all-time peak of 740,000,000,000 ton-miles, or 60 percent more than 1929's load, and the 1,044,000 employees was still far under the 1929 level.

MINING

Fifty-five years ago our 21,800 mines and quarries employed 542,500 miners, who worked with tools powered by 1,300,000 horsepower of prime movers, or less than 2½ horsepower per man. By 1940 the number of mines had decreased one-half to 10,800, the miners increased less than one and one-half times to 705,800, but installed horsepower jumped nearly ten times to 12,100,000 horsepower. The inevitable result is as follows:

Mine Output Per Man-Year, U.S.A.

	1870	1929	1941
Coal, bituminous and anthracite	300	900	1,000 tons
Copper	5,000	45,000	88,000 pounds
Iron Ore	300	2,500	3,300 long tons

(Sources: 'Technological Trends and National Policy'
and U. S. Bureau of Mines)

There's Only One Way

All in all, back in 1890 before the advent of the gasoline engine, the United States had less than 50,000,000 mechanical horsepower installed to drive its mines, factories, farms, ships, trains, vehicles and power plants. (*American Economic Review*, September 1933.) Today, with total employment approximately twice what it was a half-century ago, we have close to 2,000,000,000 horsepower, not including another billion horsepower built for the Army and Navy's use on the fighting fronts. (*Popular Mechanics*, April 1945.)

The future of this Continent lies in a continuation of this process; more goods with more power and less man-hours of labor. Under the Price System the use of more power with less

man-hours of labor means more unemployment, more debt and taxes, more crime, more malnutrition, and more sudden death on the home front. In a Technocracy, or a Technate, the same trend would result in security and abundance. There are no other alternatives.

The Power Age has arrived in North America, and within the next decade the Power Age will dominate this Continent from the Panama to the North Pole. Power is the steamroller of technology. Technology is a jealous god. Technology will tolerate no false gods.

HOWARD SCOTT, Director-in-Chief,
Technocracy Inc. in *Technocracy Magazine* A-9, February 1937.

You'd Think They'd Know Better

'We are greatly pleased with our new Winton. There may be improvements yet to come in such autos, but it is difficult to see much room for them.'—Andrew Carnegie, in 1905, as quoted in the *University of Knowledge* by Glenn Frank.

'The car I now bring out is considered by me as pretty close to finality—so close that I call it "my farewell car." I shall let it stand as my topmost achievement.'—R. E. Olds, pioneer designer and manufacturer of automobiles in an advertisement in the *Scientific American*, Jan. 6, 1912.

'I want to be on the safe side. Nearly all the inventions that are possible have been invented. Soon there will be no more, and this office will have to close. I want to get into something else now while I have the opportunity.'—A Clerk in the Patent Office before the turn of the century, as quoted in the *University of Knowledge*, by Glenn Frank.

'Man is a Tool-using animal—nowhere do you find him without Tools; without Tools he is nothing, with Tools he is all.'—Thomas Carlyle in *Sartor Resartus*.

Technology Marches On

The Pace Is Accelerating

By Research Division 8741-1

PRINTING

Printers on the *Jersey Journal*, Jersey City, N. J. went on strike June 12, 1945. They stayed out all during June, July and the first week of August. The newspaper got out a weekly 'photo-engravers' edition without employing any printers.

On August 10, 1945, Rudolph E. Lent, business manager of the paper, made the following announcement in the weekly 'photo-engravers' edition:

The *Jersey Journal* is investigating a new method of producing its publication. It is expected that by next week it will be possible to produce the first publication utilizing this method. A product with news and features closely resembling the normal issue will result, followed shortly thereafter by inclusion of regular classified and display advertising.

On August 16, 1945 the 40 printers on the *Jersey Journal* voted to go back to work. Printers on the *Bayonne Times*, Bayonne, N. J., who were also out on strike, also voted to go back.

The *Birmingham Post*, the *Birmingham News* and the *Age-Herald*, all of Birmingham, Alabama, were closed down for five weeks between July 11 and August 15, by a strike of union printers.

On August 15th the *Birmingham Post* published a four-page photo engraved edition. The *News* and *Age-Herald* were planning a similar combined edition. On August 16 the printers of all three papers voted to go back to work.

In 1940, the T.N.E.C. Monograph

No. 22 had the following to say in regard to the advance of technology in the printing industry:

The ultimate development would be the development of a photographic method of printing. This development awaits only the invention of an adequate method of preparing the negative and an inexpensive sensitizer. If the photo-engraving process were to replace printing as the facsimile machine threatens to replace the teletype system, labor in the printing trades would be almost completely eliminated.

For a more complete analysis of technology in the printing trades, see The Printing Industry Worker in the Great Lakes Technocrat, May-June 1945, issue No. 73, page 43.

AGRICULTURE

A new cranberry harvesting machine is based on the vacuum cleaner principle. The device draws the cranberries through two hoses. A separator draws off leaves and twigs which are dropped into a bag. The berries are passed through a hopper, which grades them for size. The harvester is operated by 3 men and is said to do the work of 30 hand pickers. (Business Week, January 6, 1945).

Ed. Note: See Changing Agriculture in The Technocrat, January 1940, page 15.

Forrest Woods of McLean County, Illinois, was high man in the 1944 Illinois Ten-Acre Corn Growing Contest, with a yield of 182.05 bushels per acre of No. 2 corn. (Fortune, April 1945). Ed. Note: See Technocracy Study Course, page 258.

AVIATION

The Central Aircraft Corporation of New York has developed a flying wing. It is more commonly known as the Burnelli Flying Wing. Vincent Burnelli is president of the company. On August 16, 1945, Clyde Pangborn, famous pilot, who made the first non-stop flight across the North Pacific, put this flying wing through its paces. The test took place near Montreal. The craft weighs 27,000 pounds and the fuselage, being designed as part of the wing, provides 60 percent of the craft's lifting power. It took off after a run of only 650 feet. With a full load of four tons, it can take off in less than 800 feet. The wing can also land within 800 feet, or less. The center portion of the wing, or fuselage, is 20 feet wide, 30 feet long and 7 feet high and accommodates 22 passengers comfortably. Overall wing span is 86 feet and it is powered by two 1250 h.p. engines. Top speed is 215 miles per hour and cruising range 1500 to 2000 miles. The tail is a twin boom assembly. Although not an extra large plane, the wing's ability to take off and land from short runways gives it a tremendous advantage over conventional planes. (Data from *Chicago Tribune*, August 16, 1945.) *Ed. Note: See Technocracy Magazine A-21, published November 1941, page 21.*

PAPER PRODUCTION

The paper and pulp industry is producing more paper than in 1942 with 10 percent fewer employees in mills, the American Paper and Pulp Association announced today. Production per employe increased from 98 tons in 1939 to 117 tons in 1944, the association said.

Chicago Sun, March 11, 1945.
Ed. Note: See Technocracy Study Course, page 118.

SCRAP ALUMINUM

The problem of recovering aluminum from complex scrap materials, without being forced to sort out the non-aluminum parts, has been solved. The process also separates the aluminum from admixed alloying substances. The resulting product is the same as aluminum manufactured from bauxite. The process uses a caustic soda which dissolves the aluminum but not the non-aluminum parts and alloyed substances. By filtering, the solid impurities are then removed and the residual liquor manufactured, by the Bayer Process, into pure aluminum oxide. 'It was stated that the new process makes possible the conservation of the country's high grade bauxite reserves, and of more importance, the man-hours required to mine bauxite.' (Wall Street Journal, May 8, 1945, *italics ours.*) *Ed. Note: See Technocracy Study Course, chapter 13.*

AIR FRAME MANUFACTURING

The peak of total employment and total man-hours of labor in the airframe industry were both reached in November 1943. The peak of production was not reached until March 1944. Thereafter, until May 1945, production declined gradually but in the latter month it was still higher than in November 1943. Total employment and total man-hours declined much more rapidly between March 1944 and May 1945 than production did. Output per man-hour, however, continued to rise rapidly.

The Airframe Industry assembles complete planes and manufactures component parts for the airframe portion of planes, excluding the production of gliders, motors, propellers, etc.

Taking January 1942 to equal 100, the Bureau of Labor Statistics' Productivity and Technological De-

	Production
January 1942	100
November 1943	663.4
March 1944	842.3
May 1945	667.0

velopment Division index reads as follows:

	Total Employment	Total Man-Hours	Output per Man-Hour
	100	100	100
	305.1	290.7	228.2
	285.2	273.0	308.5
	202.5	193.8	344.2

Continued on page 12

Output of airframe per man-hour tripled during the three years following the attack on Pearl Harbor. Immediately after the war, a sharp decline in aircraft production is expected. A decline in productivity is also probable, since the industry will lose some of the advantages of standardized pro-

duction in huge volume when output is reduced. On the other hand, productivity should remain well above prewar levels, because of the substantial technical advances in manufacturing methods achieved during the war. (*Monthly Labor Review*, August 1945). *Ed. Note:* See *Man-Hours and Distribution*, Part II, page 7.

ENGINEER'S WORTH TO SOCIETY

Continued from page 12
within 24 hours. Telephones and radio would be replaced by the next highest speed communication system known in the past as wig-wagging, and the baby being born in the maternity ward would arrive in the world under approximately the same intensity of illumination as did his great-grandfather, 150 years ago. If we were to do away with electricity we would be back where we were 150 years ago.

Purpose of Engineering

The engineer has provided a power supply system which has made cheap energy available to nearly everyone. He has provided transportation systems of many forms. He has provided communication systems that have surpassed human concepts of a hundred years ago. However, the *main* purpose of all of this engineering is not to provide a comfortable existence. Engineering has a deeper meaning than the mere utilization of resources. Engineering is an instrument of "Social Progress." History has shown that the

great advances in literature, art and philosophy have been made by a comparatively few people who have been provided, through the economic and social systems in which they lived, with the opportunity to devote their time and energies to such advancements. In the early days this meant that many slaves were required for every scholar or member of the "intelligentsia" who was not devoting his time to the process of earning his own living. Today engineering achievements are providing an average equivalent of 50 slaves for every man, woman and child in this country. In so doing engineering has given nearly all of our people the opportunities for an intellectual development that heretofore was restricted to a very few. Thus we see that engineering is not only necessary if our American way of life is to be continued, but it is also a key to Technical, Social and Economic Progress.

Just how engineering will fit into our social order of the future is hard

Continued on page 50

Each in His Own Tongue—

By Publications Division 8741-1

VOICE OF THE PRICE SYSTEM

FOOD

It is quite probable that never in recent history has the nation been as well fed, considering the population as a whole. It is only natural that those groups of the population whose consumption has normally and habitually been relatively high should experience the illusion that there is a food shortage.

From *Business Conditions*, published by the Federal Reserve Bank of Chicago. (As reported in the *Chicago Sun*, July 1, 1945.)

FREE ENTERPRISE

During the war we have gotten away from the American idea of free enterprise and equal opportunity. The kind of conversion upon which I would like to see us center our attention is reconversion to the belief in the American way of life, the way under which we grew strong and had a capacity—though utterly unprepared—to win this war.

John M. Hancock, a partner in the investment banking firm of Lehman Bros., at a dinner meeting of the Economic Club of Chicago, December 11, 1944. (As reported in the *Chicago Sun*, December 12, 1944.)

DEPRESSIONS

... depressions are never abolished because they have many desirable features. Smart folks take advantage of the boom. They save what they can and keep their savings liquid. They are then ready for depression-

time bargains in every conceivable thing from a suit of clothes to a railroad.

Ralph M. Blodgett, advertising executive, of Des Moines, Iowa, in an article published by the Bureau of Economic and Business Research, College of Commerce, University of Illinois (as reported by Sydney J. Harris in his column 'Strictly Personal' in the *Chicago Daily News*, August 22, 1945.)

HOUSING

If we don't get rid of OPA rent restrictions we will not have much new residential construction. . . . Builders are ready to break ground for new projects, but they are tired of controls and programming and must be assured of freedom from restrictions.

Joseph E. Merrion, president of the National Association of Home Builders, and Floyd Dana, president of the Chicago Real Estate Board. (As quoted from an interview by Al Chase in the *Chicago Tribune*, August 18, 1945.)

WARFARE

War is a business, and to be successful it must be conducted on a profit and loss basis like any other business.

Al Williams, Military Expert of the Scripps-Howard papers in his column in the *Washington Daily News*, June 4, 1945. (As quoted by the Peoples Lobby Bulletin for July 1945.)

EMPLOYMENT

... in any case, full employment requires a perfection of

management that we have no right, in a democracy, to assume.

By the Editors of *Fortune*, in 'Transition to Peace; Business in A.D. 194Q' in *Fortune*, January 1944. (As quoted in the *Economic Outlook*, published by the CIO for June 1945.)

POLITICS

Let private enterprise remain but it's got to be enterprise. There is only one justification for either nationalization or private ownership—that is efficient service in the interest of the nation.

Herbert Morrison, lord president of the council in Britain's labor government, in a broadcast to America July 18, 1945. (As reported in the *Chicago Tribune*, August 19, 1945.)

ANTI-CONSERVATION

. . . in reality (TVA) is an anti-social institution, its evil effects far outweighing any social

progress and reform it professes to have promoted.

Andrew Jackson May (Dem. Ky.), Chairman of the House Military Affairs Committee in the July 1945 issue of *National Republic*. (As reported by Carleton Kent in his column in the *Chicago Daily Times*, July 7, 1945.)

CLERICALISM

With the cooperation between the South American countries increasing, French and English Roman Catholics in this country along with the Catholics of the United States and South America will be able to establish an order based upon the ideals and traditions of Christianity.

Father A. L. Davis of Ottawa University in a speech before a Catholic Youth Organization, quoted in the *Ottawa Journal*, January 19, 1942. (As reported by the *Converted Catholic* for June 1945.)

VOICE OF TECHNOLOGY

SOCIAL CHANGE

We are going to stand alone for the principles of free enterprise. And how long can we stand alone? Perhaps five or ten years. The handwriting is on the wall. . . . The days are not far off when the masses in our country may say: 'You and your systems have failed.'

Daniel J. Tobin, president of the International Teamsters Union. (As reported in the *Chicago Sun*, August 19, 1945.)

RACIAL STRIFE

Negroes and whites can never get along in a society such as ours based on competition and stratas

of importance in social and economic life.

Dr. Mandel Sherman, professor of educational psychology at the University of Chicago, speaking before the women's division of the Chicago Urban League, January 23, 1945. (As reported in the *Chicago Daily News*, January 24, 1945.)

EDUCATION

In our education we have ignored existing evils. We have presented to our children a system supposedly perfect. Our educators and citizens have lacked the courage to stand up against the opposition of those who would profit from suppression of essential facts. For years we have

seen the finest flower of our youth, graduates of our schools, universities, and law courses, those who might have shown private initiative, seduced and prostituted to the purposes of greed in the service of great corporations and financial institutions. Robots and hypocrites resulted.

While our schools and universities are dependent upon politically controlled legislators, or plutocratic donors through the great foundations or financial institutions, they must first meet the needs of those who feed them, rather than those who come to be fed. . . . When our educational system and its processes are investigated as the anthropologist investigates the cultures of other peoples, we shall see that we have no system, only an accumulation of anachronisms, of vested interests, of medieval leftovers. We shall discover that its processes are without biological orientation, that our educators have been engaged in hopeless, destructive fumbling in the dark jungle of what we call our intellectual life toward ends that are non-existent, towards goals that are mere will-o'-the-wisps.

Porter Sargent, outstanding educational leader in his book, *Between Two Wars* (The Failure of Education, 1920-1940). (As quoted in a review by W. C. Clugston in *The Progressive*, July 23, 1945.)

DEPRESSIONS

Depression was our number one problem, and it was still unsettled. The war temporarily solved it. When the war ends it is not safe to assume that we

will not find this same problem waiting for us after the obvious and immediate job of reemployment has been done.

John Maurice Clark, professor of economics at Columbia University. (As quoted in an editorial in the *Chicago Daily News*, February 14, 1945.)

THE ATOMIC BOMB

Classical economics and politics are out of the window. There won't even be any debate about 'private enterprise' in relation to this thing. It cannot be controlled by any group of people for their own profit. At one step, the state, dislike the thought as we may, becomes the only possible trustee of this tremendous power and, therefore, assumes an importance never before known in history.

By an unnamed correspondent, as quoted in *The Trading Post*, a department of the magazine *Business Week*, in its issue of August 18, 1945.

ATOMIC POWER

The energy liberated by the uranium fission will, it is to be hoped, in the years to come find application in power plants, thus raising the prosperity of all nations through collaboration and thereby also stimulating progress in the higher sense of the word.

Lise Meitner, famous Jewish woman physicist (who contributed signally toward early efforts to split the atom in Europe) in an article in the *Chicago Sun*, August 22, 1945.

The oil required to fill the tanks of a single battleship would heat the average home for 20 years.—*Chicago Sun*, Sept. 3, 1945.

So Wags the World—

Fascism (Social Reaction)

vs.

Anti-Fascism (Social Advancement)

By Research Staff of Great Lakes Technocrat

With this issue **GREAT LAKES TECHNOCRAT** presents a new department. It consists of a digest of some of the more important fascist and anti-fascist social events occurring around the world. Standard Price System sources of information are used. In order to save space, these will not be quoted, but kept on file for reference. The incidents cited are mostly of the type played down by the Price System press. Therefore, they have not had wide circulation. The purpose here is to provide our readers with factual information of events on the world stage, so that they can evaluate the forces of fascism and anti-fascism in North America. At home or abroad, fascism is a menace to the Power Age civilization of North America.

NORTH AMERICA

The State Department recently published a 2,000 page report on American foreign relations in 1930. The chapter on Germany is very revealing. George A. Gordon the American charge d'affaires, at the time, wrote Secretary of State, Henry Stimson that 'Hitler received very substantial financial support from certain large industrial interests' in Germany. He also wrote that he had heard that 'Certain American financial interests' were actively backing Adolph Hitler and his Nazis as a means of combating trends toward socialism in Germany.

The 1945 census of Agriculture shows that the number of farms in the U.S. is still decreasing and that the average size of farms is still increasing. Two thousand out of the 3,087 counties report that the total number of farms dropped from 3,759,199 to 3,717,497 or 1.1 percent. Farm acreage in these counties rose 7.5 percent and average size of farms rose from 170.9 acres to 185.8 acres. The number of farms in Illinois dropped from 213,439 to 206,481. The aver-

age size of farms in Illinois is 153.2 acres. This is an increase of 5.4 percent in size of the average farm over 1940. The fact that the average size of farms in Illinois is smaller than the national average is accounted for by the addition of 600,000 acres to the State's croplands since 1940. Even at that there were 6,958 fewer farms in Illinois than in 1940.

CANADA

A statement prepared by a special committee and read at the 21st Conference of the United Church of Canada recently stated: 'We have reason to believe that many Roman Catholic clergy are being exempted from certain income tax obligations and we believe it is the responsibility of all clergy to pay such taxes in accordance with government regulations.'

The Canadian Army Newspaper *Maple Leaf*, published in Holland, proposes that Canada adopt a national flag and a national anthem. Said the *Maple Leaf*: 'There are some who would cry treason as soon as any one

suggests changing from the Union Jack and "God Save The King." That is their privilege. But it is foolish to regard as treason a desire for a country and a people to wish to identify themselves among nations, to strengthen the framework of national unity.'

The account gave some views of Canadian soldiers. Said a Lieutenant from Toronto, while stationed in Holland: 'I've not seen anything on this side of the Atlantic that's worth fighting to perpetuate.' Said another: 'The United States and Canada can keep to themselves and let tottering old Europe topple. We've lots of room in America for better Europeans who want to leave this antiquated ship.' Many similar statements have been made by Canadians in Holland. Several said that they favored a union between the United States and Canada.

SOUTH OF THE RIO GRANDE

In North America, north of the Rio Grande, the illiteracy rate runs about 6 percent and the illegitimacy rate around 2.4 percent. South of the Rio Grande, including all of South America, the illiteracy rate runs from 60 to 80 percent of the population and the illegitimacy rate from 25 to 50 percent. By their works shall ye know the fascists!

ARGENTINA

Testifying recently before a Senate sub-committee, headed by Harley M. Kilgore (Dem. W. Va.), William L. Clayton, Assistant Secretary of State, stated that there were 104 business companies in Argentina which are known centers of espionage or other aggressive activity, i.e., German and other-fascist activity. So far the Argentine Government has not moved against a single one of them.

A foreign correspondent for a Chicago paper reports that there is a

vigorous and growing underground movement in Argentine opposed to the government. It publishes six newspapers, which are circulated clandestinely. The movement is called Patria Libre. Estimated membership is 50,000, which, however, is almost totally unarmed. Over 1000 members of the underground are in prison at the present time.

BRAZIL

Monsignor Carlos Duarte, Bishop of Maura, was excommunicated from the Roman Catholic Church recently. His crime was openly to criticize the Vatican's policies. Bishop Duarte said he objected to the 'fascist infiltration of the clergy.' He stated his aim as being a church 'that will not feed on politics, as the Roman Church has since the third century.' Bishop Duarte has started a church of his own.

The Volta Redonda steel plant, the largest in South America, will be a fully functioning enterprise before the end of 1945. The prewar per capita consumption of steel in Brazil was 22 pounds. In the U.S.A. it was 880 pounds. In 1942 all Brazil's steel mills turned out only 160,000 tons of steel. In the same year the U.S.A. turned out over 80,000,000 tons. Volta Redonda will have an initial capacity of 1,000 metric tons daily. Ultimate capacity will be 1,000,000 tons a year.

COLOMBIA

In the summer of 1942 President Alfonso Lopez of Colombia was kidnapped. A number of Army officers were convicted of being implicated and sent to prison. On May 30, 1945, three men were arrested by the police of Bogota as they left a house on Carrera Cuarta. They carried handbags which contained 18 revolvers, 200 cartridges, 1,000 pesos in cash and a 'series of compromising docu-

ments.' On June 1, 1945, fourteen imprisoned Army officers revolted and seized the prison where they were doing time for one or another attempt to overthrow the government. The revolt was quashed. In the middle of June 1945, bitter demonstrations broke out between the students of liberal National University and students at Jesuit Universidad Javeriana. President Lopez declared a state of siege. In the last two years, eight attempts have been made to overthrow the government. In March 1945, the government reported finding 1,000 bombs hidden in the cathedral at Bogota.

PERU

On January 7, 1945, the government of Peru issued a decree ordering that: 'All religious activities other than those of the Catholic (Roman) Church must be held inside the churches of the respective denominations.' The decree was based upon a constitutional provision 'permitting religious freedom but protecting the Catholic (Roman) Church.'

Peru is undertaking a large industrial development program. The program includes full development of the power potential of the Santa river, Peru's largest west coast stream. Work has begun on the 125,000 kilowatt Canyon del Pato project. In 1941 Peru's total installed power capacity was 219,746 kilowatts. In the U.S.A., for the same year, it was over 44,000,000 kilowatts. Full development of Peru's program envisions:

1. Development of anthracite reserves in the Santa valley, estimated at 10,000,000 tons.
2. Steel plant construction at Chimbote.
3. An irrigation project to fertilize 250,000 acres.
4. A cement mill and other industries based upon minerals said to exist

in this region. An export-import bank credit has been set up in favor of the Banco Central of Peru to finance purchases in the U. S. of materials and equipment required for the program.

EUROPE

GERMANY

Dr. Gerhard Alois Westrick, who was expelled from the United States in 1940 as being a Hitler emissary, is now directing efforts to salvage and revive German industry. Dr. Westrick was installed in his job by a Count Douglass, a British Associate of the International Telephone and Telegraph Company. Recently Dr. Westrick conferred with two higher officials of I.T.&T. at Schloss Langerstein in Baden. The I.T.&T. controls the Standard Electric Company of Berlin, Germany, whose president is Dr. Gerhard Alois Westrick.

During the war, the headquarters of the German General Staff was officially supposed to be in the center of Berlin, in the General Staff Building. Actually, this official headquarters was only a false front. The real headquarters was in the village of Zossen, a suburb of Berlin. Here the General Staff officers lived and worked in completely equipped and appointed quarters deep underground. Elevators led down to the offices and living quarters, from heavy concrete structures on the surface cleverly concealed in a patch of forest. The Red Army seemed to know all about this. When they moved in, they came so fast that they captured the entire installation intact. The Staff officers had fled, of course, but the technicians, who serviced and operated the complex radio, telegraph, telephone, air-conditioning, lighting and other apparatus, remained.

Hans Beltow, a German engineer, waited at the surface entrance for the

Russian soldiers. He conducted them cheerfully underground. The elevators were not working at the time so they descended by means of a spiral staircase. Down below, corridors led in all directions with rooms opening off the hallways. In the technical operating rooms there were crudely lettered signs, hanging from the apparatus at several points. They were printed in bad Russian and said: 'Soldiers, don't touch or damage the apparatus. It will be valuable booty for the Red Army.' The notices had been placed there by German technicians. And, where were these engineers and technicians? They had hidden themselves deeper underground in the huge safe of the Time Bureau, while the officers and auxiliary personnel of the General Staff were fleeing. They reasoned correctly that they had nothing to fear from the Red Army.

ENGLAND

On August 21, 1945, Dr. J. W. C. Wand was consecrated as Bishop of London for the Church of England. Two formal protests to the appointment, on the ground that Dr. Wand was a 'Roman Catholic and not a fit and proper person for the position' were presented to Vicar General Philip Baker Wilbraham in the vestry before the ceremony. When the procession entered St. Mary's Woolnoth Church, disorderly demonstrations broke out among the onlookers. Two hundred persons shouted, 'You are hirelings of Rome,' disturbing the consecration. The protests subsided only at intervals during the ceremony.

Ministry of Agriculture figures show that 600,000 less acres were farmed in the United Kingdom during the war than in the prewar years. Production of wheat, barley and oats was 3,500,000 tons greater, however, than in 1939, potatoes 4,500,000

tons greater, and a quarter million tons more sugar beets were raised. In 1944 the wheat crop was 82 percent above the 1939 level; barley 89 percent; oats 64 percent; rye 625 percent. In October 1944, Britain had 9,548,000 head of cattle, more than ever before in her history and fresh milk going into consumption was 37 percent more than in the last prewar year. The British Iron and Steel Federation has announced a five year program to extend steel production in Britain from 14,500,000 tons a year to 17,500,000 tons. Ten new blast furnaces are projected. When completed, there will be a total of 120 furnaces.

ASIA

CHINA

The United States loaned China \$500,000,000 in gold to help stabilize its inflated currency. The Chungking government adopted a policy of selling some of this gold from time to time so as to retire some of the surplus currency notes inflating the money market. The price was set at 20,000 Chinese dollars for one ounce of gold. This deflationary operation proceeded satisfactorily for a while. Then the Chungking government decided to speed up the deflationary process by raising the price of gold. Some insiders, carefully covered up, got wind of the government's plan. They passed the word to speculators. These chiselers hastened to buy up all the gold they could get for 20,000 dollars an ounce. A few days later, the government announced the new price of 35,000 dollars an ounce. Ergo, the gents who thriftily bought gold at 20,000 dollars an ounce turned right around and sold it for 35,000 dollars an ounce. The pro-fascists of Chungking cleaned up millions on the deal. And what of our Uncle Samuel and his efforts to stop inflation in China?

Don't worry about that. The beneficence of that old gentleman with the whiskers passeth all understanding. That's the Price System for you.

John Lucian Savage, chief designing engineer for the Bureau of Reclamation, was 'loaned' to China to investigate the possibility of building a gigantic dam on the Yangtze, the world's fourth longest river. His report was favorable. Savage designed Grand Coulee, Boulder Dam and sixty other dams. He is considered the world's greatest authority on hydroelectric projects. The site for the proposed dam is at Ichang, east of Chungking. Ultimate capacity, it is said, will be 10,500,000 kilowatts. Another 2,500,000 kilowatts could be developed on tributaries. Boulder and Grand Coulee combined are 2,353,800

kilowatts. It is said the dam would generate electricity incredibly cheap, would end the annual Central China floods, double crop production on 10,000,000 acres of farm land and permit 10,000 ton ships to come to Chungking, 650 miles from the ocean. Said Mr. Savage: 'With the possible exception of some tributary of the Amazon, this is, beyond all question in my personal experience, the greatest single potential source of hydro power in the world today.' The question of what a nation of 450,000,000 with a handicraft-agrarian civilization could possibly do with vast amounts of cheap electric power has not been answered. One suggestion is that it be utilized to make fertilizer to sell in the Orient so as to help raise more food. *Ed. Note: See Technocracy Study Course. Lesson 8.*

ENGINEERS WORTH TO SOCIETY

Continued from page 42

to say. But there is no reason to believe that progress is over. The fields of research have not been harvested. Science is not limited to the past. Knowledge stands before us like the Rock of Gibraltar and is just about as hard to penetrate. Every few years some rugged individual with plenty of originality, foresight and initiative appears on this rock with an ample supply of intellectual dynamite and proceeds to blast away some huge chunks. Then a lot of lesser individuals come along with their special tools and pick away at the pieces. Men who have blasted away some sizeable chunks are well known. When Edison invented the incandescent lamp he started the electric power industry which now has an annual revenue of two billion dollars. Bell with his in-

vention of the telephone started an industry that has revolutionized the country and at the present time employs 450,000 people. That is Engineering. When Westinghouse developed his A.C. system of transmission he made possible the use of energy in one part of the country from a source in another part. That is Engineering. When Kettering invented the electric starter for the automobile he placed under the hoods of American cars more H.P. in the form of starting motors than is installed in all the power houses in the country and at the same time prevented the breaking of 60,000 human arms annually. This is Engineering. Now all of these contributions are fundamental and they are all alike in one respect. They have lead to greater human happiness.

In the Question Box—

By Speakers Division 8741-1

Dears Sirs:

I am only a high-school student, but I am in sympathy with the program of Technocracy Inc. I have received two issues of your magazine from local section headquarters. I have enjoyed all of the articles and departments, and think you have an excellent magazine.

I noticed the request for questions from readers in the last 'Question Box.' There is one question that I would appreciate your answering for me. The question is this: 'Please explain fully the difference between Technocracy and socialism.' I know this may seem like a foolish question to anyone who has studied Technocracy, but this is one of the most frequent questions I run up against when talking to friends about Technocracy. It would be greatly appreciated if you would answer this question in concise terms in one of the forthcoming 'Question Boxes.'

Thanking you for your trouble,

Yours truly,

Henry Elsner, Jr.

Dear Mr. Elsner:

It would take more space than we have available to 'explain fully' the difference between Technocracy and socialism. The best we can do is to outline the major differences and let you carry it on from there. It will readily be seen that Technocracy has borrowed nothing from any school of socialism.

Types of Socialism

Philosophers have been dreaming up solutions to social problems for ages, inspired by humanitarian motives and instinctive yearnings. There are many records of attempts to outline ideal social systems. Some one once said 'socialism is a vast lake of philosophy into which all creeds dip for ideas. According to that definition, there is no end to the possible schools of thought on socialism. Besides primitive tribal communism and various Christian sects on communism, there are several main schools of socialism. Among these are Utopian, Fabian,

Christian, Guild and Marxian Socialism.

Most schools of socialism are either evolutionary or reformist in nature, seeking to correct only the worst abuses of the Price System or to reform it by degrees into some type of ideal commonwealth. Marxian socialism or communism, however, is revolutionary in character. The father of communism is Karl Marx, 1818-1883; its fundamental plan of action is the Communist Manifesto, written in 1848; and its basic textbook 'Das Kapital' was written from 1867 to 1894. In order to set forth the main differences between Communism and Technocracy, it will be necessary to compare the background, the foundation, the method of approach to social problems, and the end results of both communism and Technocracy.

COMMUNISM

Background

The background of communism is an old-world complex of a priori

philosophical and moral concepts about justice, liberty, equality and fraternity. These concepts arose out of the social problems of an older Continent where there is a poverty of natural resources, a backwardness of modern industrial growth and an established pattern of social stratification, together with a clash of diverse class interests handed down from ancient times. The background of communism antedates the industrial revolution. Because of that, the observations and studies of Karl Marx embodied in 'Das Kapital' are heavily weighted with moral and philosophical urges arising only out of a mental vacuum of hopes and ideals. The facts set forth by Karl Marx in 'Das Kapital' are valid only for the Victorian age, because they are based upon a study of the contemporary economic structure of that day and that land.

Foundation

The basis of communism is the materialistic conception of history, and the theory of the class struggle. The essentials of these concepts are that every historical incident can be traced to some economic reason, and that the whole history of mankind can be stated as a struggle between the owning class and the working class. This theory of history is called dialectic (logic of) materialism. This materialistic logic of Marx is offered as a philosophy of every department of social life.

Method of Approach to Social Problems

The plan of action communism proposes is outlined in the Communist Manifesto, and other literature. It is derived from the theory of the class struggle. According to this theory, as industrialization proceeds, the owning class will become smaller in numbers

and the working class correspondingly larger. When the proper imbalance is attained, the workers will revolt and establish the dictatorship of the proletariat. Thus, it is seen that communism's method of solving social problems is by the use of violence and the dictatorship of one group over the whole of society.

End Results of Communism

The end results of communism are proclaimed to be the abolition of classes, private property and the State, and the establishment of equality. The dictum is 'From each according to his ability and to each according to his need.' These stated aims are essentially a priori philosophic concepts. Finally, the end results of communism are international, and intended to be applied to the whole world.

TECHNOCRACY

Background

The background of Technocracy is a survey of the energy, natural resources and industrial capacity of North America, carried on by the Technical Alliance of North America, between 1919 and 1933. This survey established the physical factors which constitute the foundation of Technocracy's program, determine its method of approach, and dictate its end results. The Energy Survey of North America was an exhaustive scientific study of existing facts on this Continent today.

Foundation

The basis of Technocracy is the law of energy determinants and the application of the methods of science to the social order. The theory of energy determinants is new in human thought. It relates the fundamental physical law regarding the flow of

energy upon the earth and its application to social problems. It states that energy is basic in any society producing its physical wealth through the degredation of extraneous energy. The application of science to the social order lays down the credo that all social problems can be solved by scientific and technological methods.

Method of Approach to Social Problems

The method of Technocracy is educational. It is designed to provide Americans with unvarnished facts and scientific study of our common social problems; and to disseminate the design of a new social control to replace the Price System when it must be abandoned. This method of approach is non-political, non-Marxian and non-philosophical. Technocracy is not a pattern of action based upon violence, but a body of thought based upon education.

End Results of Technocracy

The end results of Technocracy is a scientifically organized, non-political social system in North America. This will be based upon a balanced load system of production and distribution, continuous full load operation of all industrial equipment and physical costs of accounting of production and distribution. It is designed for the North American Continent only. Technocracy does not guarantee to abolish classes, nor make people equal, nor even to make them happy. It only guarantees to provide an abundance, leisure and security for all citizens with equal opportunity in life through the operation of an efficient design. This design, as prepared and presented by Technocracy, is the mechanics of area operation under scientific and technological control—The Technate of America.

CONCLUSIONS

The background of communism lies in an economy of scarcity, and its concepts of materialism, the class struggle and the proletariat are valid only for the cultures and the time out of which they arose. The background of Technocracy lies in the most highly industrial Continent on earth and runs concurrently with the social culture of this day, the Power Age.

The foundations of communism are rooted in philosophical and political concepts of a struggle for power. These concepts exist only in the imaginations of those who persist in the economic dictums of the primary stages of the industrial revolution. The foundations of Technocracy arise out of Science and physical laws. It has no theory about the assumption of power, and is not a class movement, but the first social mass movement in history.

The method of communism is revolutionary in nature. Its use of violence, designed for industrially backward nations, would destroy all civilization in a highly industrialized country, where the complex development makes all people dependent on the uninterrupted operation of the industrial plant.

The method of Technocracy is to carry on a campaign of education to inform Americans of the nature of the physical trends undermining the Price System and to prepare against the inevitable breakdown or transition period that must come.

The end results of communism are abstract and vague. There is no such thing as equality, except in a graveyard, and since there is no such thing as equality, there will always be differentiation among individuals in any social system. The abolition of the State equals anarchy or a State where there is no State. This is insane.

The end results of Technocracy are stated thus: 'The paramount concern of the social state is the welfare of the human components involved.' Social classification will be upon the basis of social accomplishment. The Technate will be neither an autocracy, an oligarchy, nor an industrial democracy. It will be governed by principles of Science incorporated in the design which will be an orchestration of man and physical laws for the benefit of man.

SUMMARY

North America is a new Continent, possessed of abundant natural resources. It has more than 1,600,000,000 of installed horsepower, 73 percent of the graduate engineers of the world, the largest body of trained personnel on earth; 19 percent of the world's land area and only 9 percent of the world's population. Here are all the materials necessary for a culture of abundance, leisure and security.

America's social problem arose out of these conditions. A new culture has been developed here, the culture of the Power Age. Its problems are the problems of the Power Age. They are as new and different from the social problems of other lands and times as its culture is. Therefore, the solution must be new and different too. All philosophical and political approaches to social problems, from Plato up to and including Karl Marx, must be avoided. They arose out of foreign cultures and their dictums are foreign to America. To postulate a solution of today's problems on yesterday's facts is proof of arrested mental development.

The complex industrial development of this Continent determines that a communist revolution or a fascist coup de tat would mean the

stoppage or destruction of the equipment upon which all Americans are dependent. This would be fatal to 75 percent of the population. The operation of this complex equipment requires the services of the Scientist and Engineers, no less than that of the untrained, and vice versa. Ninety-eight percent of all power used today in American industry is derived from coal, oil, gas, wind or falling water. The concept that human labor produces all wealth is not valid in America. Physical goods and services are the result of the application of extraneous energy and technological methods in industry. Most of the actual human labor is supervisory, attendant or accessory in nature, and even that is steadily being taken over by automatic mechanisms and the photo-electric cell.

There never was any fixed social stratification in America. Class lines have always been fluid. Consequently, the theory of the class struggle does not fit the picture here. All Americans belong to the same class, as they are all struggling to chisel an existence out of a dying economic order. The theory that the most untrained workers could take over and operate a complex industrial mechanism by some magic called 'industrial democracy' is insane. It ignores all the facts. There is no democracy in production and distribution; there is only design and function. Successful operation of modern equipment requires specialized knowledge and training. Either a thing works or it doesn't. If it works, it is functional, and no democracy is needed. If it does not work, no amount of democracy will cause it to function. The factor which determines the workability of any process is its design. Beliefs and opinions have nothing to do with it.

America's social problem must be solved upon the basis of society as a

whole instead of the theories of any pressure groups. The stupid reactionary and the emotional radical are alike incompetent. Communism is an organized effort by incompetent, emotional radicals to overthrow by force the dying economic order and substitute a 'workers' paradise.' Fascism is the consolidation by stupid reactionaries of all minor rackets into a major monopoly to preserve by force the dying economic order, for as long as possible. 'After me, the flood.'

Did I Say No?

'Do you know that the right to gripe actually belongs only to those who are doing something to maintain all human rights? You realize that Europe was softened up by getting the minorities inside nations scrapping with one another, don't you? You know, too, don't you, that whoever you are, you belong to several minority groups yourself?

'Are you going to get up a little alley-cat gang to "protect" your prejudices, childish fears, and selfish interests?

'Can you tell the difference between a fact and an opinion?

'If the answer to that is no, then you realize, don't you, that your brain is merely a small whirlpool of self-administered mickey finns?'—Philip Wylie, author and columnist, in the *New York Post* (quoted in *Everybody's Digest*, Aug. 1945).

'TO WHOM IT MAY CONCERN: It is my considered editorial opinion that 75 percent of all published books are worth a maximum of 25 cents each. This is a generous figure.'—Philip Wylie, author of *Generation of Vipers*, in the *Chicago Daily News*, Dec. 6, 1944.

'Free speech does not give any one the right to shout fire in a crowded theatre.' (The late Oliver Wendell Holmes, Justice of the U. S. Supreme Court.)

Today it is possible on the North American Continent to achieve the highest standard of living and civilization ever known on this earth. All the essential necessities are here. It is a physical certainty if we organize to get it.

Technocracy is the social aspect of Science. It calls on all Americans to unite and operate in a culture of abundance; or perish in the shambles of the dying Price System.

Agrotechnology

'A farm with a power demand of 3,500 kw . . . with a connected load of 14,000 hp. in 1,000 motors, was described by B. L. England, Atlantic City Electric Co. (at Nov. 13, 1944 meeting of the Interstate Power Club, New York City). This superfarm in Southern New Jersey contains 30,000 acres, uses power for refrigeration and quick-freezing, for irrigation, for dehydration and for many other operations and consumes around 15,000,000 kw-hrs. (of electricity) annually. This will be more such operations after the war, according to Mr. England.'—*Electrical World*, Nov. 18, 1944.

'If some Office of Production Research & Development projects sound imaginative, you should see the schemes officials have turned down—the proposed study of "mechanical equipment for soilless agriculture" in California.'—S. H. Scheibla, in his article 'America's Amazing Invention Incubator,' in the *Wall St. Journal* 1/26/45 (Italics ours).

'Chrysler used to say more speed for the automobile wasn't a problem; the problem was how to stop them. Our money spenders are in the same position—they can't quit now—that would mean economic suicide. Three hundred billions for War—why not 300 billions for Peace?'—From the *Journal of the Ohio State Chiropractic Society*, April-May 1945.

Language of Facts

'There is magic in graphs. The profile of a curve reveals in a flash a whole situation—the life history of an epidemic, a panic or an era of prosperity. The curve informs the mind, awakens the imagination, convinces. Graphs carry the message home. A universal language, graphs convey information directly to the mind. Without complexity there is imaged to the eye a magnitude to be remembered. Words have wings, but graphs interpret. Graphs are pure quantity, stripped of verbal sham, reduced to dimension, vivid, unescapable.

'Graphs are all inclusive. No fact is too slight or too great to plot to a scale suited to the eye. Graphs may record the path of an ion or the orbit of the sun, the rise of a civilization, or the acceleration of a bullet, the climate of a century or the varying pressure of a heart beat, the growth of a business, or the nerve reactions of a child.

'The graphic art depicts magnitudes to the eye. It does more. It compels the seeing of relations. We may portray by simple graphic methods whole masses of intricate routine, the organization of an enterprise, or the plan of a campaign. Graphs serve as storm signals for the manager, statesman, engineer; as potent narratives for the actuary, statist, naturalist; and as forceful engines of research for science, technology and industry. They display results. They disclose new facts and laws. They reveal discoveries as the bud unfolds the flower.

'The graphic language is modern. We are learning its alphabet. That it will develop a lexicon and a literature marvelous for its vividness and the variety of its application is inevitable. Graphs are dynamic, dramatic. They epitomize an epoch, each dot a fact, each slope an event, each curve a history. Wherever there are data to record, inferences to draw, or facts to tell, graphs furnish the unrivalled means whose power we are just beginning to realize and to apply.'

By Henry D. Hubbard, National
Bureau of Standards, Washington, D. C.

Some Technocracy Section addresses in Great Lakes area

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8040-2—Box 356, Ambridge, Pa.
8040-3—340 Brighton Ave., Rochester, Pa.
8041-1—1613 East 51st St., Ashtabula, Ohio.
8141-3—39 E. Market St., Akron, Ohio.
8141-4—2237 Front St., Cuyahoga Falls, Ohio.
8141-7—P. O. Box 270, Barberton, O.
8141-14—P. O. Box 553, Kent, Ohio.
8141-15—10537 St. Clair Ave., Cleveland 8, Ohio.
8240-1—207 N. Washington St., Galion, Ohio.
R. D. 8242—c/o Arthur C. Clayton, Marine City, R. No. 1, Mich.
R. D. 8242—c/o John Reynolds, St. Clair, R. No. 2, Mich.
8341-1—1430 Adams St., Toledo 2, Ohio.
8342-1—9108 Woodward Ave., Detroit 2, Mich.
8342-2—708 Garland St., Flint 4, Mich.
8342-2—55 Niagara, Pontiac, Mich.
8439-1—P. O. Box 81, Station A, Dayton, Ohio.
8741-1—3178 N. Clark St., Chicago 14, Ill.
8743-1—2204 W. Vliet St., Milwaukee 5, Wis.
8844-1—217½ Pine St., Green Bay, Wis.
8844-2—1011 W. College Ave., Appleton, Wis.
8844-3—135 Van St., Neenah, Wis.
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9344-1—28 N. 8th St., Minneapolis 3, Minn.
R. D. 9344—527 Wabasha St., St. Paul 2, Minn.
9439-1—817 Walnut St., Kansas City, Mo.
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R. D. 9737—4442 Bayley, Wichita 9, Kan.

TECHNOCRACY

NORTH AMERICA'S ONLY SOCIAL DYNAMIC

WHAT?

★ Technocracy is the only North American social movement with a North American program which has become widespread on this continent. It has no affiliation with any other organization, group or association either in North America or elsewhere.

★ The basic unit of Technocracy is the chartered Section consisting of a minimum of 25 members and running up to several hundred.

★ It is not a commercial organization or a political party; it has no financial subsidy or endowment and has no debts. Technocracy is supported entirely by the dues and donations of its own members. The widespread membership activities of Technocracy are performed voluntarily; no royalties, commissions or bonuses are paid, and only a small full-time staff receives subsistence allowances. The annual dues are \$6.00 which are paid by the member to his local Section.

★ Members wear the chromium and vermillion insignia of Technocracy—the Monad, an ancient generic symbol signifying balance.

WHERE?

★ There are units and members of Technocracy in almost every State in the U. S. and in all Provinces in Canada, and in addition there are members in Alaska, Hawaii, Panama, Puerto Rico and in numerous other places with the Armed Forces.

★ Members of Technocracy are glad to travel many miles to discuss Technocracy's Victory Program with any interested people and Continental Headquarters will be pleased to inform anyone of the location of the nearest Technocracy unit.

**Great Lakes Technocrat,
843 Belmont Avenue,
Chicago 14, Illinois**

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WHEN?

★ Technocracy originated in the winter of 1918-1919 when Howard Scott formed a group of scientists, engineers and economists that became known in 1920 as the Technical Alliance—a research organization. In 1933 it was incorporated under the laws of the State of New York as a non-profit, non-political, non-sectarian membership organization. In 1934, Howard Scott, Director-in-Chief, made his first Continental lecture tour which laid the foundations of the present nation-wide membership organization. Since 1934 Technocracy has grown steadily without any spectacular spurts, revivals, collapses or rebirths. This is in spite of the fact that the press has generally 'held the lid' on Technocracy, until early in 1942 when it made the tremendous 'discovery' that Technocracy had been reborn suddenly full-fledged with all its members, headquarters, etc., in full swing!

WHO?

★ Technocracy was built in North America by North Americans. It is composed of North American citizens of all walks of life, Technocracy's membership is a composite of all the occupations, economic levels, races and religions which make up this continent. Membership is open only to North American citizens. Aliens, Asiatics and politicians are not eligible. (By politicians is meant those holding elective political office or active office in any political party.)

★ Doctor, lawyer, storekeeper, farmer, mechanic, teacher, preacher or housewife—as long as you are a patriotic North American—you are welcome in Technocracy.

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Not 'Booms and Depressions,' but *Balanced Load Operations*

Not 'Business Methods,' but *The Scientific Method*

Not 'More Postwar Promises,' but *More Goods and Services*

Not 'Political Machinery,' but *Functional Sequences*

Not 'Decision By Opinions,' but *Decision By Facts*

Not 'Dictatorship of the Proletariat,' but *Dictums of Technology*

Not 'Class Warfare,' but *Mass Social Action*

Not 'Equality of Birth,' but *Equality of Opportunity*

Not 'The Nobility of Labor,' but *Energy and Technology*

Not 'The Right to Work,' but *The Opportunity to Consume*

Not 'Security in Old Age,' but *Security from Birth to Death*

Not 'Pie in the Sky When You Die,' but *Abundance Now*

Not 'Private Right and Privileges,' but *The General Welfare*

Not 'Free Enterprise,' but *Free Technology*

Not 'Sovereign States,' but *Mechanics of Area Operations*

Not 'Geopolitics,' but *Geotechnics*

Not 'Back to Normalcy,' but FORWARD to the NEW AMERICA

Not 'Chiselocracy,' but *Technocracy*

Think North American!